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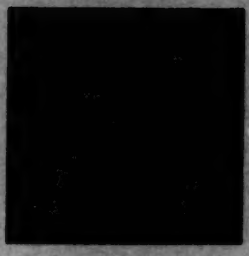

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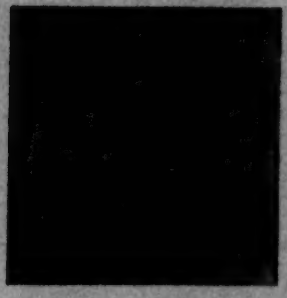

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1. Genus Raillietina
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TENTH WORLD'S POULTRY CONGRESS
MESSAGE FROM THE PRESIDENT, M. A. WILTZER TO MEMBERS OF THE W.P.S.A.

Scarcely have the echoes of the Ninth World's Poultry Congress held in Paris in 1951 died away than it is time to start thinking of our Tenth Congress, which is due to take place in Edinburgh from 13th to 21st August, 1954.

A National Committee formed in Edinburgh is at present organizing this Congress and Major Macdougall, to whom I should like to take this opportunity of expressing our warmest thanks, has been in Edinburgh several times for discussions with the organizers. The preliminary work in respect of our next Congress is thus well under way.

Her Majesty Queen Elizabeth and her husband the Duke of Edinburgh have graciously consented to become patrons of the Congress.

It is by no means too early to start thinking of organizing National Committees in the various countries and of choosing the speakers who are to be asked to prepare reports. I therefore appeal to all individual members and to all Associations conected with us to spare no effort to make known the fact that our Tenth Congress is approaching, and so ensure for it the greatest measure of success.

Poultry breeding is making consistent progress throughout the world, and the different countries I have visited during the past few years have all shown an ever mounting interest in our work, together with an output that is increasing by leaps and bounds.

It is not only right, but imperative that the Tenth World's Poultry Congress should mirror this progress and should be crowned with even greater success, I hope, than has attended previous Congresses.

I know I can count on the devotion, hard work and publicity efforts of all our colleagues and friends to ensure a gathering which will be worthy of the wonderful advance of Poultry Breeding throughout the world.

4th April, 1953.

UNIDENTIFIED FACTORS FOR POULTRY[1]

G. F. COMBS
University of Maryland, College Park, Md., U.S.A.

During the last 20 years, nutrition as a science has been characterized by the rapid elucidation of specific required nutrients. From 1834 to 1953 we have progressed from the single nutrient concept to one which includes more than fifty. One should not be surprised, then, to find reports at the present time which provide evidence for other factors, as yet unidentified, which are required for growth and reproduction in poultry.

The isolation of vitamin B_{12} and subsequent availability for use in experimental work made possible further progress in the search for new factors. In 1949, Menge et al, reported that a dried whey product and certain liver preparations supplied unidentified chick growth factor activity, even when adequate levels of vitamin B_{12} were given. Similar observations for fish meal and dried brewers' yeast were made by Carlson, et al (1949). The results of studies by Combs, et al (1950) revealed the presence of two chick growth-stimulating substances in refined fractions prepared from liver, not identical with vitamin B_{12} or any other known nutrients. Sunde, et al (1950) also found fish solubles or liver to stimulate growth of chicks fed practical type rations. In similar studies with poults, menhaden fish meal, crab meal and dried brewers' yeast were found to supply unrecognized nutrients required for rapid growth (Combs and Shaffner, 1950). Arscott and Combs (1950), using a corn-soybean oil meal type chick ration, also obtained growth responses which plateaued suboptimally when either menhaden fish meal or butyl molasses fermentation solubles was added singly at different levels. When these were added together in the ration, a significantly greater growth response was obtained than when either was added alone. This observation was interpreted to mean that two different unidentified chick growth factors are involved. Subsequent work by Kohler and Graham (1951) and Menge, et al (1952) support this conclusion.

Heuser and Norris (1951) reported additional evidence for the unidentified growth-stimulation activity of fish meal and fish solubles. Combs (1951) also tested the value of Menhaden fish meal and crab meal in broiler rations fed under

[1] Scientific paper No. A415. Contribution No. 2444 of the Maryland Agricultural Experiment Station (Department of Poultry Husbandry).

practical conditions. The calculated increase in return over feed cost per 1000 broilers marketed as a result of adding 2½% fish meal, 5% fish meal or 5% crab meal was $27, $21 and $31, respectively. Other reports by McGinnis, et al (1952), Fuller, et al (1952), Slinger, et al (1952) and others have offered further evidence for an unidentified growth factor in fish solubles or fish meal.

Menge, et al (1951) and Menge and Combs (1952) reported studies wherein a 340-fold concentration of an unidentified chick growth factor was accomplished from liver. Menge, et al (1952) have also reported a concentration of an unidentified growth factor present in fish solubles. More recent studies suggest that the factor in liver and fish solubles may be the same, although this cannot be completely determined at this time.

Groschke (1950) presented evidence which suggested that the addition of certain antibiotics to the diet spared the dietary requirement of the chick for an unidentified growth factor present in whey. Jones and Combs (1951) and Heuser and Norris (1951) also observed similar sparing effects of antibiotics on the chicks requirement for the unidentified chick growth factor in fish products. Nevertheless, the addition of antibiotics appears only to lessen the need for these unidentified growth factors, rather than eliminate it. Reed, et al (1950), Matterson and Singsen (1951), Combs (1951), Kratzer (1952), Fuller, et al (1952) and Branion and Hill (1953) have obtained responses from fish products or other unidentified growth factor supplements even though an antibiotic was fed. Scott and Jensen (1952) reported that aureomycin feeding spared the dietary requirement of the poult for an unidentified growth factor in fish meal to a lesser extent than it spared the requirement for an unidentified growth factor not supplied by fish meal.

Animal products have also been found to contain an unidentified factor required for hatchability. Couch, et al (1950) and Stephenson and Clower (1952) reported that a liver preparation and fish solubles, respectively, contain a new factor required for hatchability. Recent work (Arscott and Combs, (1953) has also revealed that fish solubles contains an unidentified factor required for hatchability. Without a source of this factor the hatchabilty of fertile eggs dropped to about 45% with hens fed a corn-soybean oil meal type ration.

It should be stated here that in our experience at the University of Maryland chicks fed practical type rations do not respond in all trials to various unidentified factor supplements. This implies that other things must influence the critical need for these factors. Among such factors considered likely to be involved are 1) differences in the body stores at hatching time as influenced by the ration fed the dams, 2) effect of antibiotics, environment, and diet composition on bacterial flora established in the intestinal tract of the chick, 3) variation of ration ingredients with regard to their unidentified factor potency, 4) multiplicity of unknowns involved with different ones limiting growth and 5) genetic differences in the requirement of chicks for these factors.

The fact that responses are usually obtained, however, is ample basis for including sources of these factors in practical rations. Since at least one of these unknown factors is supplied by fish meal, crab meal and fish solubles, it is considered necessary to use a minimum of 2.5 to 5.0% meal, or the equivalent, in all starting rations for chickens and turkeys. Breeder mashes to be fed with grain should also contain this same minimum level. Sources of the other unidentified growth factor, or factors, are dried whey, dried brewers' yeast, dried distillers solubles and certain other fermentation products.

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SATISFACTORY ALLOWANCES OF MINERALS IN THE TOTAL FEED FOR POULTRY

Suggested by Dr. H. W. Titus

(From the Proceedings of the Semi-annual Meeting of the Nutrition Council of the American Feed Manufacturers Association, Dec. 1-2, 1952)

	Chickens		Turkeys	
	For Growth	For Egg Production	For Growth	For Egg Production
Calcium, %	1.0 -1.5	2.0 -2.8	1.5 -2.0	2.2 -3.0
Total phosphorus, %	0.6 -0.9	0.7 -1.3	0.75-1.0	0.7 -1.3
Inorganic phosphorus, %	0.2 -0.4	0.3 -0.5	0.3 -0.5	0.3 -0.5
Total salt (NaCl), %	0.4 -0.7	0.4 -0.7	0.4 -0.7	0.4 -0.7
Added salt (NaCl), %	0.25-0.4	0.25-0.4	0.25-0.4	0.25-0.4
Magnesium, %	0.05-0.5	0.05-0.5	0.05-0.5	0.05-0.5
Potassium, %	0.2 -1.2	0.2 -1.2	0.2 -1.2	0.2 -1.2
Iodine, PPM	1 -5	1 -5	1 -5	1 -5
Manganese, PPM	50 -100	35 -100	50 -100	35 -100
Cobalt, PPM	ca. 0.1 (?)	ca. 0.1 (?)	ca. 0.1 (?)	ca. 0.1 (?)
Copper, PPM	5 -10	5 -10	5 -10	5 -10
Iron, PPM	30 -100	30 -100	30 -100	30 -100

PPM=parts per million

PARASITE PROBLEMS OF STANDARD BREEDS OF POULTRY IN EGYPT[1]

W. MALCOLM REID[2]
Monmouth College, Illinois, U.S.A.

It has been a pleasure to visit the Amateur Poultry Breeders Association meetings on several occasions and to discuss mutual poultry problems. This was a special pleasure since I too used to raise Barred Plymouth Rocks for poultry shows in the United States and occasionally was able to bring home some blue ribbons. Your organization is in a key position in the poultry industry. In the past it has done much to create interest in the standard breeds of poultry. It is now in a position to pioneer in the field of scientific poultry practice in Egypt.

You may be interested in knowing some of the results of my year of research studying poultry parasite problems. In general it may be said that there are few if any important species of internal or external parasites in Egypt which we do not have in the United States. This fact, plus some of the experimental evidence reviewed below, has convinced me that parasite problems present no serious handicap to large-scale introduction of standard breeds of chickens into Egypt. More careful experimentation is needed in the field of viral and bacterial diseases but here again no concrete evidence is available to indicate that the standard breeds cannot be successfully reared in Egypt. Much that has been learned in the field of preventative disease control, sanitation and poultry nutrition could well be adapted to conditions in Egypt. All too often in my country as in yours the large conspicuous parasites which are present in small numbers in healthy birds are blamed for disease conditions by a partially-trained diagnostician. He must have an answer to write on his report. Frequency of diagnosis of parasitic disease makes the poultry raiser aware of the presence of parasites. Drug firms have been quick to capitalize on this awareness to bring in more business—to their gain and the poultryman's loss.

This does not mean that poultry parasites can be ignored. They are responsible for tremendous insidious losses. These losses can be prevented by an understanding of the con-

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[1] Address before the Amateur Poultry Breeders Association of Cairo, Egypt.
Egypt August 4, 1952, translated into Arabic by Col. Omar Draz.

[2] Fulbright Research Scholar, Faculty of Veterinary Medicine, Fouad I University, Cairo, Egypt.

trol measures for each individual parasite.

External Parasites. By far the most serious parasite thus far encountered is the soft tick or "blue bug" (*Argas persicus*). In the larval stages it clings to the flesh of the bird as it engorges blood. The adult is able to hide in minute cracks or crevices around the roosting place and comes out only occasionally for feeding at night. Since it is very flat it often escapes notice and considerable poking around in cracks and crevices may be necessary in order to locate it. Once found it is very desirable to take radial measures to eliminate it. Not only does it cause blood loss and anemia but it is a proven vector of two serious poultry diseases. These are spirochaetosis or fowl syphilis and a malaria-like disease. At least with the first of these diseases it has been shown (Dardiry 1945) that standard breeds are more susceptible to the disease than native fowls.

Radical control measures are necessary to eliminate these parasites once they become established. Some American authorities consider the pests so serious that they recommend burning the chicken house and rebuilding. But elimination can be accomplished with less radical measures. Frequent spraying with strong concentrations has been successful with some of the newer insecticides such as hexachloridane and DDT. Painting or spraying all cracks with one part kerosene and two parts crude oil has been recommended. Whatever the measures they must be thorough and frequently repeated. The goal must be complete elimination. Once eliminated inspection should continue and strictest quarantine maintained. Herons and pigeons may introduce the parasites. Pigeon houses are often heavily infected with a closely related species (*Argas reflexus*).

Two other external parasites have occasionally been noticed as problems. The scaly-leg mite cripples older fowls and causes crusty scales upon the legs. Where possible affected individuals should be culled from the flock or one of a number of oil compounds applied to the legs. Various species of lice have been encountered occasionally. They can be effectively controlled by dusting with DDT, sodium fluoride or hexachloridane preparations.

Internal Parasites. By far the most prevalent internal parasite in Egypt is the large intestinal roundworm *Ascaridia galli*. This parasite was shown to be present in 55% of the chickens posted by Gaafar (1952). In our own survey work we have found almost 100% of the chickens infected from

some localities. In the limited areas surveyed, only in the Oasis of Siwa does it appear to be absent. Its absence here and the ecological conditions leading to its absence give a clue to one possible control measure. Since poultry has frequently been shipped into Siwa its absence cannot be due to isolation. Rather it seems to be associated with the dryness of the floors which prevents worm eggs from developing. Fertile parasite eggs require about three weeks in a damp place before they become embryonated and infective. In the Valley frequent sprinkling of the floors or pens to lay the dust, irrigation, and a damp place around watering devices all give ideal areas for egg development.

These parasites are most harmful to chickens of less than three months of age. Heavy doses may cause emaciation and diarrhea. Natural immunity reduces the severity of infection after three months of age. Even in light doses the host is robbed of much valuable food. Combining data obtained in this survey and physiological data obtained in the States (Reid 1945) it can be calculated that this worm alone consumes 90 tons of useful carbohydrate each year in the 16,000,000 million chickens in Egypt.

Controlled experiments are now in progress to test the susceptibility of Barred Plymouth Rocks to *Ascaridia galli* as compared to a group of baladi chickens. The object was to see if long years of natural selection might have resulted in resistance to this parasite in the baladi chickens. Ten to 15 week-old chicks of each group were given 50 ± 5 infective eggs of *A. galli* on a piece of filter paper. At the end of three weeks the chickens were all autopsied, the worms from each chicken were counted and accurately measured for length. Statistical comparison of the number and length of worms indicates no difference between the two groups. In other words the baladi and the Plymouth Rocks showed the same amount of resistance to this parasite. The same method used in the United States has shown differences between some of the standard breeds. (Ackert, Eisenbrandt, Wilmouth, Glading and Platt 1935.) These results must be regarded as preliminary as this experiment is being repeated this fall. But evidence so far indicates that the standard breeds can do as well in Egypt as the baladi as far as this parasite is concerned.

Control of this parasite should aim at preventative measures rather than individual treatment. These measures include (1) introduction of new stock to clean quarters free from infective eggs (2) protection of young stock from exposure un-

til three months of age (3) insuring partial resistance against infection by means of adequate vitamins, minerals and amino acids in the diet and (4) keeping quarters dry.

Tapeworms of various species are very common poultry parasites. Fahmy (1952) has reported four species from Egyptian fowls. Two others have been found in the survey now in progress. There is an even larger loss of host food due to these parasites because their carbohydrate consumption rate is higher than in roundworms. From similar data on tapeworm metabolism (Reid 1942) it can be estimated that loss of usable carbohydrate exceeds 175 tons a year in Egyptian chickens. Since fowls become infected by eating various species of insects such as ants, beetles, flies and other arthropods, there is little chance for direct control measures to give protection. Best practice consists in feeding a well-balanced diet which builds up resistance against parasitism. Although there has been much experimentation, no adequate tapeworm drug for chickens has yet been discovered.

As a visitor who has been studying the poultry industry it seems to me that there are three possible programs which your Association might sponsor for the good of the poultry industry. Each of these activities would be very much in line with good poultry practice in other countries. The details of the program would of course have to be worked out in your own way as you have competent technicians in Egypt to assist you with this work. These are as follows: (1) Make all flocks in the Association pullorum free by means of a regular testing program (2) Encourage the development of a feed-mixing industry in which ready-mixed feed could be purchased at low cost. This program should include regulations requiring publication of feed analysis data. It appears that much valuable time is wasted by each individual having to obtain all of the separate ingredients himself. Mixed feed which is now available in many poultry countries has greatly encouraged the industry. (3) Sponsor an egg laying contest. Members of your organization have pioneered in exciting interest in the large egg size of standard breeds but most Egyptians do not seem to appreciate the larger number of eggs these standard breeds can produce. Data on the number of eggs produced by different breeds of chickens in Egypt does not seem to be available. Interest in these contests has greatly increased the egg production records of poultry in other countries and the whole industry has benefited therefrom.

I shall follow with interest the various activities of this organization as I continue work on animal health problems under a Point Four assignment in Egypt.

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MUCH INTEREST IN EXHIBITION POULTRY IN AUSTRALIA

Judging from a lengthy letter received from Mr. A. L. Edmunds, Victoria, Australia, the breeding and exhibiting of exhibition poultry is carried on extensively in that country. Mr. Edmunds has been breeding Old English Games for over 40 years. He says that there are about 800 registered exhibitors of exhibition poultry living within 50 miles of Australia's capitol city of Melbourne. All exhibition poultry shows are conducted under the auspices of the Poultry Central Council. Besides the two large shows held annually at Melbourne and Victoria, there are many suburban clubs which hold monthly meetings and small shows.

Mr. Edmunds states that commercial poultry producers have their own poultry clubs, these producers being mainly interested in market egg production. It might not be amiss to observe that the world's first twelve-month laying contest was inaugurated in Australia in 1902. About 40 years ago, average-egg production records of many strains entered in these contests were so relatively high that breeding stock was imported by several poultrymen on the Pacific Coast of the United States.—Morley A. Jull.

PREVENTION OF ENLARGED HOCK DISEASE IN TURKEYS AND DUCKS

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It is the object of this report to present experimental results which show that the enlarged hock disorder which develops in young poults receiving practical-type rations containing cod liver oil can be prevented by supplementing these rations with niacin and vitamin E. A similar disorder in ducklings has been prevented experimentally by supplementation of a practical-type diet with niacin alone. Evidence will also be presented which indicates that much of the effectiveness of dried brewers' yeast in preventing these disorders is due (1) to the high level of available niacin in yeast and (2) to the fact that yeast contains highly potent antioxidant properties capable of protecting vitamin E in the ration and/or in the body of the young poult.

EXPERIMENTS WITH DUCKLINGS

Because of the fact that a bowed-leg disorder in commercial ducklings is known to be an economic problem to duck growers, it was considered desirable to determine whether or not dried brewers' yeast, which had previously been shown to be effective in preventing enlarged hocks in turkey poults, would also prevent the bowed leg disorder of ducklings. The basal diet used in these studies is presented in Table 1. When this diet was fed to day-old white Pekin ducklings on wire-mesh floors, all of the ducklings developed severely bowed legs by the end of the third week. The addition of cod liver oil was not necessary in order to produce a 100% incidence of bowed legs in ducklings. Supplementation of this diet with 7.5% of dried brewers' yeast completely prevented the occurrence of the bowed leg disorder during an 8-week growth period.

In further experiments it was found that a mixture of all of the known vitamins prevented the disorder as effectively as dried brewers' yeast. By omitting one vitamin at a time from the complete vitamin mixture, it was discovered that bowed legs developed in the ducklings only when niacin was omitted from the mixture. The results of an experiment comparing the effectiveness of pure synthetic niacin with that of dried brewers' yeast is presented in Table 2. These results show that the addition of 10 milligrams of pure niacin per

pound of diet is required in order to completely prevent bowed legs in ducklings. The 7.5% level of dried brewers' yeast, supplying approximately 10 milligrams of niacin per pound of ration, also prevented the disorder. On the other hand, increasing the niacin level in the diet by 5 mg. per lb. by means of increasing the amount of wheat standard middlings had no effect upon the incidence of bowed legs in the ducklings. These results indicate that the niacin in dried brewers' yeast is completely available, while that in wheat standard middlings is relatively unavailable for the duckling. The extent to which the niacin present in other natural feedstuffs is unavailable for the duckling remains to be determined.

TABLE 1

Basal Diet—Duck Experiments

Ingredients	Per Cent
Corn meal	40
Wheat flour middlings	15
Wheat standard middlings	15
Pulverized oats	10
Fish meal	8
Soybean oil meal	10
Dicalcium phosphate	0.5
Limestone	1.0
Salt, iodized	0.25
D-activated animal sterol	0.1
Stabilized dry vitamin A	0.1
Riboflavin supplement	12 gm/100 lb
Manganese sulfate	12 gm/100 lb
Approximate Composition:	
Protein —	19.7%
Fat —	4.2%
Fiber —	4.3%
Ca —	1.0%
P —	0.8%
Niacin —	13.6 mg/lb

TABLE 2

Niacin, Yeast and Middlings in the Prevention of Bowed Legs in Ducklings

Treatment	Incidence Bowed Legs %	Average Weight gm.
None	100	1080
Vitamin mixture	0	1313
Vitamin mixture (less niacin)	100	1125
Niacin—5 mg/lb	45	1315
Niacin—10 mg/lb	0	1263
3.8% Dried brewers' yeast	25	1333
7.5% Dried brewers' yeast	0	1336
28% Standard middlings	100	1243

STUDIES WITH YOUNG POULTS

Although the basal diet used in previous studies on the enlarged hock disorder in turkeys contained 10 milligrams of added niacin per pound of diet, an experiment was undertaken to determine whether or not additional niacin would prevent enlarged hocks in turkeys as it had in the experiments with ducklings described above. The basal diet used in these experiments was similar to the one described previously (1) except that niacin was omitted from the basal diet. A sufficient amount of this basal diet was mixed for use in two experiments. One-half of this amount was used in the first experiment, while the other half was stored for use in the second experiment which was started four weeks later.

EXPERIMENT 1

For the first experiment various levels of niacin were fed in combination with various levels of cod liver oil. The experimental plan and results are presented in Table 3. Since a level of 20 milligrams of niacin per pound of diet completely prevented enlarged hocks when the diet contained 1% of cod liver oil but only reduced the incidence of hock trouble by 50% when the diet contained 4% of cod liver oil, it appeared either that the niacin requirement for prevention of enlarged hocks was increased as the level of cod liver oil in the diet increased or that a second factor was required in addition to niacin and that this factor is destroyed by high levels of cod liver oil in the diet.

TABLE 3

Results of niacin experiment #1

Treatment	% Cod liver oil in diet		
	1	2	4
	Incid. enl. hocks, 2 wks, %		
Basal	100	100	100
10 mg Niacin/lb.	55	80	—
20 mg Niacin/lb.	0	10	50

* 12 BBB poults per lot.

EXPERIMENT 2

In order to determine whether or not a higher level of niacin would completely prevent enlarged hocks in the presence of 4% of cod liver oil, a second experiment was conducted using the portion of the same basal diet mixture used in Experiment 1 that had been stored at room temperature for four weeks. The results of this experiment, presented in Table 4, show that a level of 30 milligrams of niacin per pound of

diet did not prevent the development of enlarged hocks in the poults. These results indicated, therefore, that a second factor, easily destroyed in the presence of cod liver oil and also unstable during storage at room temperature, must be required in addition to niacin for prevention of this disorder.

Since vitamin E is known to be destroyed in the presence of cod liver oil and during storage in a mixed feed, it was considered possible that vitamin E might be the second factor required for prevention of enlarged hocks in turkey poults.

TABLE 4

Results of niacin experiment #2

Treatment	% Cod liver oil in diet	
	2	4
	Incid. enl. hocks, 2 wks., %	
Basal*	100	100
20 mg Niacin/lb	86	64
30 mg Niacin/lb	57	71

* Basal diet same mixture used in Experiment 1.
Stored in warm room 4 weeks.
15 BBB tom poults per lot.

EXPERIMENT 3

A third experiment was conducted, therefore, to test the effects of niacin and alpha-tocopheryl acetate alone and in combination. The results of this experiment, presented in Table 5, show that the combination of 20 milligrams of niacin and 20 milligrams of alpha-tocopheryl acetate per pound of diet caused a marked increase in growth and completely prevented the enlarged hock disorder in turkey poults. Further experiments confirmed these results and indicated that the minimum levels, in order to prevent enlarged hocks in turkeys, were 20 milligrams of niacin in combination with 5 milligrams

TABLE 5

Experiment with niacin and vitamin E #1

Treatment*	Avg. wt. 3 wks.	Incid. enl. hocks
	gm.	%
Basal (2% CLO)	348	100
20 mg. Niacin/lb	358	83
20 mg alpha-tocopheryl acetate/lb	397	58
Niacin + alpha-tocopheryl acetate	451	0

* 12 BBB tom poults per lot.

of alpha-tocopheryl acetate per pound of feed. Two and one-half milligrams of alpha-tocopheryl acetate in the presence of 20 milligrams of niacin was not sufficient to completely pre-

vent the enlarged hock disorder. However, when 2.5 milligrams of alpha-tocopheryl acetate was added together with 1% of dried brewers' yeast in the presence of adequate niacin, the disorder was completely prevented. Since the effect of dried brewers' yeast could also be obtained by adding a fat soluble anti-oxidant together with the 2.5 milligram level of alpha-tocopheryl acetate, it was concluded that one of the effects previously obtained from dried brewers' yeast in the prevention of enlarged hocks, was due to the potent anti-oxidant properties of yeast, which apparently act by preventing destruction of the vitamin E present in the other ingredients in the diet.

These results, therefore, furnish an explanation concerning the fact that yeast appeared to be the only natural ingredient capable of consistently preventing the enlarged hock disorder in the previous studies. First, because of the fact that yeast is an excellent source of highly-available niacin and secondly, because yeast contains anti-oxidants capable of protecting vitamin E in the diet and/or in the body of the poults.

REFERENCES

1. Scott, M. L., Poultry Science *30:* 839, 1951.
(Proceedings of the 1952 Cornell Nutrition Conference for Feed Manufacturers.)

THE CHICK EMBRYO IN BIOLOGICAL RESEARCH

Under the above title there was published in August, 1952, a monograph consisting of 30 articles of outstanding significance dealing with a vast array of biological problems involved in the development of the chicken embryo. Each article is the contribution of an outstanding authority in the particular field of discussion.

The monograph appeared in the Annals of the New York Academy of Sciences, Volume 55, Article 2, Pages 37-344. A copy of the monograph may be secured from the Executive Director, The New York Academy of Sciences, 2 East Sixty-third Street, New York 21, New York, for the price of $4.00. —Morley A. Jull, University of Maryland.

COSTS AND NET RETURNS IN PRODUCING TURKEY HATCHING EGGS

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The following statement constitutes a summary of the observations reported in Bulletin 524 published by the Oregon State College in 1952.

AVERAGE COST AND SELLING PRICE PER EGG

The average cost of producing turkey hatching eggs on 77 representative flocks in western Oregon in 1949 was 32.9 cents per hatching egg (Table 1). They were sold for an average of 33.64 cents, which left a net profit per egg of about ¾ of one cent.

TABLE 1

Cost of Producing Turkey Hatching Eggs

(77 flocks; 51,844 hens; 6,330 toms; 2,590,164 hatchings eggs; western Oregon, 1949)

Item	Cost of production		Percentage of total cost
	Per breeder bird	Per hatching egg	
		Cents	Per cent
Feed	$ 6.17	13.9	41
Labor	2.61	5.9	17
Miscellaneous	.60	1.3	4
Depreciation	5.52	12.4	36
Interest	.29	.6	2
Total gross cost	$15.19	34.1	100
Less credit (cull eggs and manure)	.55	1.2	
Total Net Cost[1]	$14.64	32.9	

[1]See Table 28, Appendix, for an estimate of cost assuming a more normal decline in the price of turkey breeding stock during the breeding season.

SIZE OF FLOCK

The average breeder flock contained 674 turkey hens and 82 toms which represented a flock between four and five times as large as the average size of flock 15 years ago. There is evidence that it may be possible to get the turkey breeding flock too large for most economical results (see the last three lines in Table 2). It will be noted that the medium-sized group (400 to 699 hens) was the most economical.

FEED REQUIREMENTS

For the 186-day breeding season, the average requirement per breeder bird was 128.5 pounds of feed. This amounted to .689 pounds per bird per day and varied considerably between size groups (Table 2). The average feed requirement

TABLE 2

Summary Factors: Turkey Hatching Egg Study

(Western Oregon, 1949)

Item	Your flock	All flocks	Average number of hens			
			100 to 399	400 to 699	700 to 999	1,000 or more
Size of farm, acres		198	150	202	225	239
Total cropland, acres		95	81	89	93	172
Total work on entire farm, days		574	402	522	686	1,083
Hens per flock, average number		674	264	522	860	2,113
Toms per flock, average number		82	32	64	106	254
Hen-tom ratio		8.2	8.4	8.1	8.1	8.3
Total feed per bird, pounds		128.5	128.2	128.2	128.8	128.6
Feed per bird day, pounds		.689	.701	.666	.671	.736
Mash in total feed, per cent		52	54	59	45	50
Protein in total feed, per cent		15.1	15.1	15.5	14.7	15.1
Total man labor per bird, hours		2.38	3.67	2.72	2.20	1.68
Total labor per day for 100 birds, hours		1.28	2.01	1.41	1.15	
Date hens were hatched, month/day		5/13	5/10	5/5	4/30	6/3 .96
Date breeder hens separated, month/day		11/16	11/15	11/7	11/8	12/4
Age when hens were separated, weeks		27	27	27	27	26
Date breeder hens sold, month/day		5/20	5/17	5/18	5/18	5/27
Breeder flock season for hens, days		186	184	193	192	175
Date hens first lighted, month/day		12/25	12/24	12/23	12/18	1/3
Date toms first lighted, month/day		12/13	12/15	12/10	12/7	12/23
Date lights turned off, month/day		3/29	3/27	3/28	3/22	4/8
Total lighting season for hens, days		95	94	96	95	96
Average light day,[1] hours		14.4	14.2	14.2	14.8	14.5
Date mating started, month/day		12/24	12/23	12/21	12/20	12/31
Date hens started to lay, month/day		1/19	1/13	1/15	1/14	2/1
Length of laying season, days		122	125	124	125	116
Lay, per cent		43.9	47.2	46.2	42.8	40.9
Total eggs laid per hen		53.6	59.0	57.3	53.5	47.4
Farm culls per hen		3.7	3.4	3.8	3.5	3.8
Hatching eggs per hen		49.9	55.6	53.5	50.0	43.6
Rejects at hatchery, per hen		1.2	1.1	1.1	1.1	1.5
Total eggs set per hen		48.7	54.5	52.4	48.9	42.1
Fertile eggs per hen		34.7	39.5	37.7	35.6	28.7
Fertility, per cent		71.3	72.4	71.9	72.9	68.2
Death loss on hens, per cent		7	5	4	9	8
Death loss on toms, per cent		14	15	13	16	14
Average depreciation per bird, dollars		5.20	5.06	4.67	5.13	5.94
Net cost of production per hatching egg, cents		32.88	32.84	30.60	31.29	38.05
Net profit or loss per egg, cents		+.76	+.52	+2.21	+1.72	—2.37
Return to operator per hour, dollars		+1.46	+1.23	+1.82	+1.75	—0.69

[1]Average light day includes natural plus artificial light.

was 2.89 pounds per hatching egg, compared to 3.34 pounds in the former study of 15 years ago.

LABOR REQUIREMENTS

The total labor requirement for the season was 2.38 hours per breeder bird, with considerable variation by size groups (Table 2). The average net return per hour to the operator for his own labor was $1.46 per hour, with the highest return ($1.82 per hour) on the medium-sized flocks (400 to 699 hens), and the lowest return (a minus $0.69 per hour) on the largest flocks (1,000 or more hens).

EGG PRODUCTION

The turkey hens in this study (51,844) produced an average of 49.9 hatching eggs per hen—not including farm culls, which amounted to 3.7 eggs per hen. With hatchery rejects amounting to 1.2 eggs per hen, the resulting number of eggs set was 48.7 per hen. The hatchability of all eggs set was 60.4 per cent. The average lay for all the hens in the study was 43.9 per cent.

FERTILITY

Fertility of the hatching eggs proved to be one of the most important factors affecting net returns. For the 2½ million hatching eggs produced in this study it averaged 71.3 per cent. There was a characteristic and important seasonal decline in fertility. Results of this study indicate that the use of lighter toms, the feeding of protein supplements, and the use of legumes in the range, all may increase the fertility of turkey hatching eggs.

TIME OF LIGHTING AND AGE OF HENS

The early-hatched, early-lighted hens were much more profitable than the later-hatched and later-lighted hens.

FORMULA FOR ESTIMATING THE COST OF PRODUCING A TURKEY HATCHING EGG

(Based on 77 flocks producing 2,590,164 hatching eggs, western Oregon, 1949)

Feed	+	Labor	+	Depreciation and miscellaneous net costs	= Estimated cost
Total seasonal (168 days) feed requirement in pounds per bird	B.A.E. price per pound of poultry ration in Oregon X 1.1057	Total man labor requirement for the season in hours per breeder bird	B.A.E. price of farm wages per hour with house, in Oregon X 1.18	Depreciation and miscellaneous net costs for the season, per bird	B.A.E. index of prices paid, interest, taxes, and wage rates (U.S.)	Average index value during study	Estimated cost of producing a turkey hatching egg

$$(128.5 \times 1.1057A) + (2.38 \times 1.18B) + [3.97 (C \div 255)] = \text{Cost of producing a turkey hatching egg}$$

44.5, total seasonal production of hatching eggs per breeder bird

$$\frac{142.08A + 2.808B + .01557C}{44.5} = \text{Cost per hatching egg}$$

$$3.1928A + .0631B + .00035C = \text{Cost of producing a turkey hatching egg (in dollars)}$$

$$319.28A + 6.31B + .035C = \text{Cost of producing a turkey hatching egg (in cents)}$$

A = Price per pound of poultry ration in Oregon; from **Agricultural Prices**, Bureau of Agricultural Economics, U. S. Department of Agriculture.

B = Price of farm wages per hour with house, in Oregon: from **Farm Labor**, Bureau of Agricultural Economics, U. S. Department of Agriculture.

C = The parity index (prices farmers pay for commodities, interest, taxes, and wage rates included); from **Agricultural Prices**, Bureau of Agricultural Economics, U. S. Department of Agriculture.

A COST OF PRODUCTION FORMULA

A simple formula, given below, has been devised by which the cost of producing turkey hatching eggs in western Oregon can be estimated for any year. It may be used to forecast estimated costs in advance of a particular hatching egg season by assuming probable prices for feed and labor and a probable number of hatching eggs per hen. The formula should be helpful in appraising trends in the cost of production from year to year so long as the general methods of producing turkey hatching eggs do not undergo any radical change.

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The American Poultry Association, Inc., the oldest livestock organization on the North American Continent, for the past 80 years has compiled and edited the only book which establishes the Standard for poultry.

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THE ECONOMIC PRINCIPLES OF POULTRY MARKETING*

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The fundamental principle of Poultry Marketing is quite simple and straightforward and can be set out in concise terms. It is only when we get down to the application of that principle and begin to work out the details that it becomes involved. I want to make it clear at this stage that where reference is made in this paper to Poultry Marketing, it is intended to cover all varieties of poultry—fowls, turkeys, ducks and geese.

The basic principle in marketing poultry, as with all farm produce, surely must be to take the product from the producer to the consumer in the best possible condition at the lowest cost consistent with efficiency. Almost everyone I imagine will be able to agree with this statement, and I venture to hope that those engaged, both in production and distribution, will keep this central purpose well in mind as they go forward with their future plans.

Now in working out, and in translating into practise, this principle, we are faced at once with a whole set of problems, not least of which is the highly perishable nature of Poultry. It will be my endeavour today to try and focus attention on some of these problems, and indicate the direction I think we ought to take if we are to resolve the difficulties and build up a marketing structure capable both of fulfilling the needs of an expanding production, and meeting the requirements of an increasingly quality-conscious consumer.

At the outset I want to make it clear that the function of distribution is a service, an essential service, of course, but not an end in itself. I think it is right to say the inevitable costs of organizing the service of taking any product from producer to consumer, are justified only to the extent, and in the manner, that the service is rendered.

In a highly industrialized country like this, with large centers of population, marketing of any product is bound to call for a high degree of organization, and table poultry are no exception. Our progressively rising standard of living demands too that a highly perishable article like poultry should

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* A paper read at a meeting of the United Kingdom Branch of the World's Poultry Science Association, London, March 20, 1953.

be available in a sound, wholesome and attractive condition, when and where it is wanted.

It will be obvious that the marketing methods which have served the past—and served them none too well at that —are wholly inadequate to meet the needs of the future, and I thing perhaps, we may with some profit, briefly have a look at these methods to see why they are no longer suitable. Apart from a few Packing Stations, as they were then called, and a number of more progressive Producers who killed and prepared their own poultry for the wholesale and other markets—and upon whom we may look as pioneers—the bulk of poultry, both hens and chicken, went through local Auction Markets or higglers or dealers and frequently enough, through all three. These buyers passed them on to the retail states of distribution. Killing and plucking were not carried out at any definite stage, in fact, quite frequently retailers themselves carried out these operations. In addition, of course, there was quite a considerable direct trade to retail shops, hotels and restaurants.

It does not require much imagination to appreciate that under such conditions only the smallest degree of uniformity and size grading could be carried out, and that improvements in processing techniques would be wellnigh impossible. It is not to be wondered at that progress towards meeting the ever-growing public demand for a higher standard product was extremely slow. Although a few specialists were undoubtedly in close touch with trade requirements, most producers took little interest in consumer requirements, and even today there is considerable apathy in this manner. Up to a point this is understandable, for the channels through which such market information could more freely flow, are only now beginning to take shape in the form of the present-day Service Station.

I suggest, therefore, that the Service Station as we know and understand it should, and can, be the channel for this information service, and in rendering it, ensure that very much to be desired link-up between the man who produces the Poultry and the consumer who eats it.

The Service Station can, and I think will, become the central pivot round which poultry production can expand, and the whole distribution system best be made to work. I would go so far as to say that, with the higher quality standards, both of product and service, required today, a successful Table Poultry Industry cannot grow up apart from the Service Station organization. The Service Station is an integral part of modern marketing.

Having then established their place, and importance, in the chain of distribution, let us examine in some detail the functions and responsibilities of these Stations. This tie-up or co-ordinating link between producer and consumer, to which I refer, is not of course direct, because as everyone knows, wholesalers and retailers come into the picture and fulfil important functions. It is rather that the Service Station by reason of its nearness to production, is able to get over to many thousands of producers the requirements of many more thousands of consumers. There are probably more than 300,000 producers of table poultry of one sort and another in this country, and we have to try to make them aware of the requirements of the consuming public.

It is only an enlightened Service Station organization that can get this over to the poultry farmer, and they (the Service Station) will have to adopt a tactful process of education designed to encourage the production of the right types, sizes and varieties of poultry most in demand. It is sometimes said we should try to educate the consumer to eat what we think best for him, but I prefer it the other way round, and believe, in this country, we have the better chance of success that way, in the long run.

It is not my intention to infer that there is no place for publicity and sales promotion propaganda, by judicious advertising, etc., for our aims must be to build up sales by encouraging consumption, and to get over to the public the fact that we are trying to meet their requirements.

I repeat therefore that in the future we must look for the expansion of table poultry production around the Service Station.

This should result in steadily increasing numbers of the sorts, sizes and qualities needed, and a corresponding, and welcomed, decrease in the supplies of inferior birds which have always been too plentiful and certainly unwanted by the majority of buyers. In actual fact, this class of trade has always been more than fully met from available by-product sources.

It will, I am certain, pay any Service Station to concentrate more on this aspect of its work, even to the extent, in some cases, of employing an expert to devote his time to helping producers with their problems, and giving them appropriate guidance.

In egg marketing the question of preserving a high standard of quality is largely accepted by producers, as it is

right through the chain of distribution, but in poultry marketing the importance of high quality is only now beginning to be understood. Most Service Stations are painfully aware of the urgency to raise quality, and as I have already indicated, they now have to apply themselves with increased energy to this pressing aspect of their work.

Without doubt the sellers' market over the past dozen years has contributed to the apparent apathy of producers in this matter of quality, but the red light is clear enough today, and if it is not heeded I fear the Table Poultry Industry will be in a sorry plight within the next few years. It is not always appreciated that, as an importing, as distinct from an exporting country, we are very vulnerable on this question of quality, for we have to contend with the competition of imported birds, and if we don't set out to give the consumer what he wants then Denmark, Holland and Canada, etc. will not be slow to seize the opportunity.

I am afraid I have spent rather a long time on this question of tying-up, or reconciling, production problems with consumption needs. I believe it is quite fundamental.

We have now established three points arising from the main principle of marketing set out at the beginning of this paper.

Firstly, we have seen we cannot get any sort of orderly marketing without bottlenecking supplies through Service Stations.

Secondly, we have established that these Stations, if they are to play their part in the build-up of this Industry, must be something more than just killers, pluckers and packers, and thirdly, we have recognized the obligation of the Industry to meet, as far as is possible, the varying demands of the consumer.

I want now, if you will bear with me, to touch on one or two aspects regarding the working of Service Stations from, as it were, the inside. The cardinal principle here is that whatever processing services are undertaken they should be efficiently and conomically carried out—more efficiently and economically, in fact, than when they are done on the farm. This may be a platitude, but none the less needs to be said. Before the war very few table poultry producers sent their birds to Service Stations to be plucked and marketed for one very simple reason. It was found cheaper to do them at home. The charges at pre-war Service Stations were from 6d. to 9d. per bird, against the farm cost of 3d. to 4d.

I am aware conditions have changed considerably since the war and it is also true that modern methods and equipment, in addition to labor problems, have made it increasingly difficult to operate on the farm. Therefore farm processing operations are likely to be less favored in the future than in pre-war days. But when this has been said, those concerned should realize that unless they keep their costs down specialist producers particularly, will be forced to consider the question of setting up their own processing units. We have yet to come back to the days, although they may not be far off, when profits on table poultry are again measured in pence, and it is then that producers will be forced to consider how, and where, they can effect a saving of even as little as a penny or twopence per bird. I give this warning because I believe this question of costs is not receiving the attention it should, and I for one don't want to see a system, calculated to put table poultry marketing on a sound footing, collapse under its own weight.

The volume of throughput, and the inevitable seasonal variations in supplies, are both factors affecting the economic working of Service Stations, and regarding the former, I have no doubt there is a minimum figure below which the capital and labor involved are not justified. But I think success is more closely related to good management, selling ability and resourcefulness rather than to mere size of operation.

In addition to good management, the type of equipment used is bound to have its influence on the economy of the Station, and it seems to me, in this matter of equipment, we have a long way to go in this country. It is a far cry from our simple dry and wet machine pluckers to the large highly mechanized American plants, but as we must learn to walk before we can run, I am satisfied, at this stage, it is right to encourage the setting up in the areas of production, these relatively small units for plucking and processing.

It may well be, through gradual adjustment, these smaller Service Stations will give place to bigger units with throughputs justifying larger and more mechanized plant, although we shall do well to feel our way in this direction, for it is a sound axiom that the first stages of marketing, i.e. killing and plucking, should be centered as close to the producing farms as is practicable.

In addition to these decentralized Stations dealing with the day to day collections of poultry and the killing and plucking, there certainly is scope for more centralized selling

and cold storage facilities. If the demand is to be met for varied grades and sizes, then clearly there must be some organization having command of larger supplies than are normally available at one Station. This envisages some form of grouping, but need not imply amalgamations, or loss of independence of the smaller and more localized units. As most of you will know this grouping for sales purposes is already operating in some areas, and I do not doubt will be extended as time goes on.

I ought perhaps to stress here the need for adequate cold storage facilities, both for short-term holding, to enable supplies to be kept off temporary unwilling markets, and for longer-term to ensure greater stability. It has been well said the person who controls the glut controls the market.

Possibly I have not succeeded very well in making clear to you the pattern of poultry marketing, as I see it. But what I have so inadequately sketched is, I believe, what is required to bring some sort of stability to the Industry, and I think you will agree this pattern is already taking shape; although the present Service Station movement certainly has to go very much further before we can claim any real orderly structure.

The concentration, or bottlenecking, of supplies is most essential with perishable produce originating from many small and diversified units. It is this fact, this large number of small unit producers, which makes the Service Station so indispensable, and at the same time provides it with an unparalleled opportunity.

The growing demand for deep-frozen chicken, drawn ready for the oven, and chicken portions, also open up another field of opportunity for Service Stations. The preparation of birds for these specialized requirements is essentially a job for the Service Stations.

It is not my intention to say much about the details of wholesaling and retailing, as these normal channels of trade are well enough known. It may perhaps be emphasized that like Service Stations their function is a service to the consumer, and on this basis they must be judged. In my view the impact on the national economy of the very high distribution costs generally, calls for careful investigation, and anyway we, in this Poultry Industry, will do well to make certain we do not build into our marketing organization unnecessary and unjustifiable expenses and margins.

There is no reason why in the long run the Service Station idea should not reduce overall distribution costs by excelling in the service which it renders, and by keeping to a

minimum the number of hands through which poultry pass on their way to the consumer. For example, in areas where there is some balance between production and consumption direct movement to retailers can save both transport and double handling.

It is here I think we are brought face to face with the question of the most satisfactory way of guiding and directing this much overdue development in poultry marketing. That some guiding authority is needed few will question. Progress can no longer be left entirely to the momentum and force born of sheer necessity.

Let me say at once that a Marketing Board set up under the Agricultural Marketing Acts would appear to be the right authority to ensure this progressive development. I think, however, a word of warning should be given here. In view of the limited number of Service Stations now in existence, and the many difficulties inevitably connected with the marketing of so perishable an article, the premature introduction of a full scheme of control might well create as many problems as it solved, and so could defeat its objective.

What is wanted at this stage, as I see it, is a scheme which will give encouragement and incentive to those seeking to improve marketing methods, and at the same time foster the stablishment of Service Stations in areas where they are most needed. The functions of a Board would also include sales promotion, collecting and dissemination of information on market requirements and trends, and keep an eye generally on all aspects of marketing. By regulation the Board would set up standards of quality and grading, and ensure that inferior quality birds were used for manufacture and not presented for sale by Retailers.

Reference should be made here to the constructive work done by the Dressed Poultry Marketing Committee of the Marketing Division of the Ministry of Agriculture during the last two or three years. National "Recommended" Grades and Grade Definitions for poultry were introduced on a voluntary basis and Service Stations of a minimum required standard were registered. The value of this work, undertaken in difficult circumstances, should not be lost sight of and its influence on future developments will be considerable.

It may be helpful if I just briefly summarize the main points I have tried to make:

(1) We set out the main principle of marketing as getting our product to the consumer in the best possible condition at the lowest cost consistent with efficiency, and that dis-

tribution should be looked upon as a service.

(2) The point was made that the methods of the past could not meet present, or future needs, either of producer or consumer, and that the bottlenecking of supplies through Service Stations was the best way of ensuring the build up of orderly marketing.

(3) The Service Station could and should form the pivotal point around which a more enlightened production policy could grow, and that not the least of the services they could render would be to help and advise on the production of the types of poultry in greatest demand.

(4) I suggested as a general principle, that we should endeavor to meet consumers' wants, and in that way to better consolidate the Industry. I also suggested that producers as a whole were not very quality conscious, and that as an importing country we were particularly vulnerable on this question.

(5) The importance of low costs with efficiency for the successful working of Service Stations was touched upon, as was the need to keep a watch on distribution costs generally.

(6) I mentioned the influence more mechanized types of equipment could have on efficiency, and that for sales and cold storage purposes grouping of Stations would be desirable. There was also the possibility, if not probability, that by amalgamation the smaller Service Stations might gradually give place to fewer larger ones.

(7) That the pattern of organized distribution mapped out, would require overall guidance and direction and the logical authority for this would be a Marketing Board under the Agricultural Marketing Acts.

Before closing and as I am a keen supporter of the Producers' Co-operative Movement, I believe the first stages of distribution can best be served by co-operative proprietorship of the Service Station. The much desired liaison between producer and Service Station is likely to be more effective under producer ownership, because closer ties can be established.

It only remains for me to say I do not believe in planning for planning's sake, or in having regulations unless they serve a useful purpose, but looking back over the chaotic marketing of the past and the seller's market of the war years, it is obvious something more stable had to emerge. Therefore I see no alternative, at the present stage, of the Poultry Industry's development, to some planned organization on the lines I have put before you today.

THE ECONOMICS OF EGG MARKETING*

G. B. WOOLFENDEN
Vice-Chairman of the National Council of Wholesale Egg Distributors
Liverpool, England

I am making no mere conventional phrase when I say I appreciate highly the honor which you have done me in inviting me to address you today. It is a matter of great satisfaction to believe that primary producers do, in fact, value the commendations and views of distributors; but I admit it is also true that distributors value the respect and co-operation of producers.

At no time in history was mutual respect between all sections of the Egg Industry more necessary than it is today —for unless there is a major alteration in the Government's policy we have only a few days of restraint left after nearly twelve years of controlled collection and distribution of eggs. During the past weeks many a happy countenance has been clouded and puzzled—and indeed, worried—and it would seem that the widespread fear that business may never return to normal is not so great as the widespread fear that it has!

It appears to me that in accepting this kind invitation to be with you today and speak on "The Economics of Egg Marketing," I am like the lion-tamer who, as the highlight of his show, puts his head into the open mouth of the lion—there is no security of future for him.

As one who has always displayed nervousness and unwholesome respect for the word "economics" perhaps I should make it clear that I am accepting the word in its widest sense, namely "the science of egg marketing"—or even more simply "the structure of egg marketing."

In my opinion the science applied to any given operation must vary in accordance with certain circumstances, whilst at the same time an exposition on the broad principles of a science depends upon the general acceptance of a basic formula. For example, we have to accept the fact that our discussion is to be about egg marketing under circumstances that are likely to operate during the next few months, namely inadequate supplies of feeding stuffs at economic prices, absence of large quantities of imported eggs and all the uncertainty that there is bound to be after twelve years of false values. Let us accept these facts and let us also agree that these

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* A paper read at a meeting of the United Kingdom Branch of the World's Poultry Science Association, London, March 20, 1953.

very circumstances have led to the present dominance of home produced eggs in the British market and that our prime objective is to see that in its present position the British Egg Industry is made unassailable.

What a different position we have today from that in the 1930's—and if reference to the 1930's brings back unpleasant memories may I suggest that it's just as well to forget your old troubles because there are a lot of new ones on the way. It must be remembered that in the world of economics the wheel of fortune quickly turns a full circle and therefore we have only a limited time in which to put our house in order and prepare to repel invaders—for invaders (in the form of cheaply produced imported eggs) we shall certainly have in a year or so from now. The seller's market is with us still but only for a limited period and we must make the maximum use of that period for the preparation of long term plans for a stable and successful Industry. The success of long term planning depends upon our actions today; depends upon whether we use the period of the interim egg scheme for laying a foundation, or as a fortuitous opportunity to make hay while the sun shines. I do sincerely hope it is the former—

"For yesterday is but a dream
"and tomorrow is only a vision,
"But today well lived makes
"Every yesterday a dream of happiness
"And every tomorrow a vision of hope."

I know little of the biological construction and day to day functioning of a hen but I am reliably informed that over a number of years it has become the custom for a hen to lay a good, fresh egg, thus proving the old adage that "the priceless ingredient of every product is the honor and integrity of its maker." This, then, must be our starting point—that although there may be an occasional fault or flaw, it can be generally accepted that hens do not lay bad eggs—nor broken ones.

At the other end of the chain is the housewife, and we also know that if she is provided with fresh eggs at a reasonable price they will be enjoyed and she will come back for more. The consumption of eggs in this country immediately before the war was estimated at 164 eggs per capita per annum and we know that in 1952 the Ministry of Food made 104 distributions of eggs and that there was a serious deficiency to meet the public demand, but we must realize that consumer prices

were held stable throughout the year by artificial means.

Our big problem is this—when control goes, how many eggs per week can the average housewife afford to buy at a price which is remunerative to the producer?

This gap between the producer and the consumer is traversed by a bridge which delights in the rare and euphonious appellation of "marketing" and it is the structure of that bridge that we discuss today. Although not an engineer it is obvious to me that the first requisite of bridge construction is to find equal levels for a land fall at each side of the chasm and if nature does not provide those levels the constructional engineer must make them. The use of the term "chasm" is not inappropriate in dealing with egg marketing for if we of the Egg Industry fail to construct this bridge properly we shall not find ourselves merely ankle deep or knee deep in troubled waters, but we shall find that we are broken and battered at the bottom of a deep pit from which we shall have little chance of recovery. As the strength of the chain is the strength of its weakest link, so the components of our bridge must be equally reliable or all will be lost, including the vast experience we have gained in the past twelve years. I venture to suggest that the greatest loss will fall on the producer for he is the one who needs this bridge to get his goods to the market—and it is equally necessary as the means by which he gets paid for his eggs.

In the practical means that we have to consider as against the theoretical picture that I have drawn, the bridge between producers and consumers is constructed jointly by packing stations, wholesalers and retailers, and between them they have to find the necessary levels to equate production and consumption.

This is not the first bridge—a rickety structure was there before the war and you will remember that plans for a new bridge were prepared—the Poultry Industry Bill of 1938—but war intervened before construction. The Ministry of Food erected the present structure in 1941 and let us pay credit to the work done; despite ill-informed and unfair criticism it has served us well. Now it is condemned as unsafe and we have to make our own arrangements pending the introduction of that marvelous bridge we have been promised—an Egg Marketing Board.

We have a good foundation on which to commence operations because fortunately it has been realized that an assured supply at an economical price is the first essential of egg pro-

duction and therefore we can plan on the basis that there will be a flow of eggs from the producers. Those of us whose duty it is to see to the marketing of eggs must take up the "slack" and see to the regular supply to the retail shops, and we must do it in such a manner that prices to the public are as reasonable as possible.

The subject of price is one of the utmost importance, and although the producer may have solved his problem in this matter, the price which the public will pay for eggs is something which is yet to be discovered and will be a matter of prime consideration in future marketing. Indeed, it is a little disturbing to hear from some of the irresponsible elements within the Industry of the need for increased prices and to hear of rash prophecies of higher values. Let it be quite clear that no matter what the justification, if prices are raised much the public will stop buying eggs in quantities necessary to clear the market regularly and a few weeks of consumer resistance on a large scale would lead to a prolonged depression in all sections of the Egg Industry—and the greatest sufferer would be the producer. Having once seen prices come down because of a refusal to pay through the nose the housewife knows her strength and will bare her teeth at any sign of an attempt to sting her. In these days of high taxation and constantly rising expenditure the public obviously considers price above everything else—but quality still counts providing it is no more than fractionally extra in cost. The day of easy spending is passed, but let us face up to the fact that that must mean a healthy spirit in trading and a demand for a good product at an economical price. This objective can be achieved without difficulty if we pursue a steady drive towards reducing distribution costs. That, of course, is easily said and not so easily done—for none of us will be tired of repeating—

"Prices have gone down a lot
Prices aren't so high
"The only things that still are up
Are those *I* need to buy."

Let us now consider the practical principles to be followed in order to achieve our ambition of orderly marketing. In my belief they lie here:

(a) An acceptance by the Producer that he will not sacrifice the substance of successful long term arrangements for the shadow of quick profits and ready money, and that therefore the packing station represents his best outlet for eggs. There must be complete confidence between producer and

packing station and a willingness on the part of each to go half-way to meet and understand the problems that the other has, and will have, in the difficult days ahead. No packing station can be maintained without regular supplies of eggs and it is in the producers' interest to see that packing stations are maintained.

(b) Concentration by the packing station on its prime function of collecting, grading and packing of eggs and a realization by each packer that his efforts should be directed to his specialist function. It is at the packing station that distribution or marketing is commencing and a daily clearance of stocks is essential. Only when complete efficiency has been achieved should the packer think of venturing into the uncharted seas of wholesaling.

(c) A firm and solid link between wholesaler and packing station providing mutual understanding and joint action to ensure speedy distribution of packers' supplies to the retail shop. It is in this mutual understanding between packer and wholesaler that we have to find our cushion to deal with fluctuating demand and changing prices.

If the housewife will not buy eggs, the retailer adopts the same attitude and supplies become immobile, with the resultant accumulation and subsquent deterioration in quality. Only the packer and the wholesaler, by prompt and joint action, can see to speedy adjustment of prices to attract the housewife to return to buying eggs, but it is to be hoped that by efficient collaboration they can anticipate such an occurrence and reduce prices in advance. You can readily understand how failure to establish this understanding can undermine the whole system of egg marketing.

(d) Concentration by the wholesaler in devising the most economical handling facilities and distribution to retailers and the adoption of a sufficiently flexible system of distribution that can be developed to meet changes in the pattern of public demand.

All sections of the Egg Industry are short of working capital, but the housewife in the majority of cases pays cash for her goods. Every section of the Industry must see that this cash passes back through the chain of distribution to the producer within the minimum time and thus eliminate one of our greatest expenses, namely the cost of financing by the banks.

Alongside all this steady striving for reduced distributive costs must come a determined effort to increase the consumption of eggs. We know that before the war it was estimated

that the average consumption of eggs was no more than 164 per capita per annum, or only just over three eggs per person per week. When we realize that in Canada and America the average pre-war consumption was double that figure we can readily see that there is much leeway to be made up. There does not appear to be much doubt that if we could increase the consumption of eggs to four per person per week we could continue to expand home production and would still be able to import as many eggs as we did before the war.

Do not let it be thought I stop at four eggs per week—my personal ambition is to see an average consumption of not less than 365 eggs per year by everyone and I shall still expect the extra one to be eaten in a leap year.

To assist in this program of expanding consumption undoubtedly active publicity will be necessary for we have many old-fashioned prejudices to overcome. For example, there is the ever-present belief that it is unhealthy to eat more than one egg a day; for some reason or other this belief is applied particularly to children—nothing is more absurd, but the belief lingers. There is equally the belief that the consumption of large quantities of eggs produces skin rash. This, too, is a prejudice and the well-acknowledged fact that certain people are allergic to various foods applies no more to eggs than it does to fish or to meat.

In emphasizing the need for speedy distribution we must not overlook the value of improvements in presentation—gone are the days of long cases of eggs outside a retailer's shop; attractive presentation in pre-packed cartons will do much to enhance the value of our product.

I do not believe that we should scorn the use of the advertising agent. It is often said that an unadvertised article is like a mule—namely, without pride of ancestry or hope of posterity. Much has been done in this direction in America where it is estimated that consumption during 1952 reached the remarkably high figure of 400 eggs per capita.

Too few housewives realize the value of eggs. After boiling, poaching, frying and scrambling eggs the majority of housewives are lost. We must bring to them the knowledge of cooking with eggs; we must teach them that in baking there is no substitute for an egg.

This process of re-education must start soon and gradually increase whilst the producer is equally increasing his poultry stock and therefore his egg production. It will cost money to achieve this object and that must be provided by

the Industry, but whatever is expended will return to the pockets of the Industry with satisfactory interest and dividends.

Don't scoff at the imported egg—it has a place in society and it has a useful purpose to serve—but so build up home production and demand for the home produced article that it fills 75% of the demand and home producers have nothing to fear of the future.

From all this you will see that it is my belief that we can maintain much that is good in the present egg control scheme; we can mould it to suit changing conditions of partial decontrol and, whilst preparing for ultimate freedom, we can use the present period of the interim scheme to advantage to build such a foundation for the future of the Egg Industry that all engaged in it are certain of a satisfactory livelihood—and no man can ever expect more than such an opportunity.

This is our opportunity; we may succeed in our task by constructing a bridge that reflects credit on the builders and ensures strength and safety to all using it.

UNITED KINGDOM BRANCH OF THE WORLD'S POULTRY SCIENCE ASSOCIATION

The Sixth Annual General Meeting of the United Kingdom Branch was held on March 20, 1953 in London under the Chairmanship of Dr. Rupert Coles, the President. The Report for 1952 reflected a small increase in membership, the total at 31st December being 338. Of that number 280 are in England, 41 in Scotland, 14 in Northern Ireland and 3 in Wales.

During the year two very successful Conferences were held and at one of these there was a record attendance of over 300.

Members are now looking forward to the 10th World's Poultry Congress in Edinburgh in 1954 and it is confidently anticipated that there will be a very large invasion from England and N. Ireland. The Branch is in a healthy financial position and for the past two years it has not been necessary to take advantage of the rule under which up to 25 per cent of the Association fees can be retained for administrative expenses.

FEATHERS CAN BE RECLAIMED FOR POULTRY FEED

J. H. VONDELL

Massachusetts College of Agriculture, Amherst, Mass., U.S.A.

Until fairly recently chicken feathers have been just a nuisance in the Nation's dressing plants. They still are in most places, but researchers at the Western Regional Laboratory, Albany, California, are pointing the way to using reclaimed feathers as a valuable source of protein. And, why shouldn't feathers make a good feed—a lot of good feed went into the making of them.

Dry feathers from ducks, turkeys and chickens have been used for pillows and sleeping bags for years. To reclaim the wet, assorted feathers from a dressing plant presented a problem. In this connection, the Western Regional Laboratory has developed a process for cooking wet feathers to produce an easily crumbled meal that has use as fertilizer, and further processing makes it available for plastics, and protein fibers. Feather meal contains over 75% protein.

The first bit of nutritional research was to reduce the feather meal to a state that could be easily digested by chicks. This appears to have been accomplished. Current available data indicated that the feather meal protein lacked certain amino acids and could not be used as a sole protein supplement. The amino acid pattern of feather meal fits in nicely with blood meal, however, so two waste products of dressing plants may be harnessed into important protein supplements in the future. A great amount of research must be conducted to find just how feather meal combines with common foodstuffs. One experiment with a standard ration shows the following:

Protein Supplement	8 weeks wgt.-lbs.	Feed Efficiency lbs. feed/lb. gain
25% Soybean oil meal (control)	1.87	2.80
14% Soybean oil meal	1.61	3.77
14% Soybean, and 3% feather meal	1.70	3.20
14% Soybean, and 6% feather meal	1.84	2.94
14% Soybean, 6% feather meal, and 3% blood meal	2.02	2.66

REVIEW OF POULTRY PUBLICATIONS

Compiled by J. W. Kinghorne,
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GENETICS

ABPLANALP, HANS, and I. L. KOSIN. (State College Washington, Pullman.)
HERITABILITY OF BODY MEASUREMENTS IN TURKEYS. *Poultry Sci. 31:* 781-791. 1952.—This study was based on the progeny of single-tom matings hatched in 1946, 1947, 1949 and 1950. The breeds involved were the Broad Breasted Bronze and the Beltsville Small Whites. The inbreeding coeffs. in the 2 breeds ranged between 10 and 12%. Three hatches were studied each year, with the brooding and rearing conditions being kept as uniform as possible at all the hatches. A "no culling" policy was the rule throughout the observation period. Body wts. were obtained at 4, 8, 14 and 26 weeks of age; measurements on keel and shank lengths as well as on breast depth and width were made at 26 weeks only. Two methods of estimating heritability were used: the 1st one based on the estimation of variance components, and the 2d on offspring-dam regressions. Because adequate numbers of toms were involved in the Broad Breasted Bronze matings, $\frac{4S}{A+D+S}$ was considered to give the best estimate of heritability. In the case of the Beltsville Small Whites, $\frac{2(D+S)}{A+D+S}$ was used. In the Broad Breasted Bronze, the highest h_O^2 value for body wt., 71%, was recorded at 14 weeks of age. In the females, the heritabilities were consistently lower, the highest estimate, again at 14 weeks, standing at 39%. The Beltsville Small White breed showed marked sex difference in the size of h_O^2 values: in the males the highest figure, obtained at 8 weeks, was 33%; and in the females at 26 weeks it was 24%. Considerable maternal influence was indicated in both breeds. No additional precision in detn. of genotype was derived from basing heritability estimations on weight gains rather than absolute body wts. Of the body conformation measurements, there were marked breed differences in heritability estimates.—*Authors.* (Biological Abstracts)

BRILES, W. E., RUTH W. BRILES, and M. R. IRWIN. (U. Wisconsin, Madison.)
DIFFERENCES IN SPECIFICITY OF THE ANTIGENIC PRODUCTS OF A SERIES OF ALLELES IN THE CHICKEN. *Genetics 37:* 359-368. 1952.—An investigation was made into the relationship between the differential agglutinability of chicken erythrocytes with normal bovine serum and the A and B blood group systems known to exist in this species. Four A alleles and three B alleles were present in the birds utilized in this study. The agglutinogens produced by these alleles were identified by means of isoimmune reagents. Through the comparison of the reaction patterns shown by the red cells of the members of 12 families (134 birds) with normal bovine serum and the various isoimmune reagents it was concluded that the A alleles were primarily, if not solely,

the determiners of the agglutinability of chicken cells with bovine serum, while the B alleles did not appear to be related to such agglutinability. The agglutinogens produced by the alleles A^{23} and A^{s} reacted strongly with bovine serum while the antigenic products of the other two alleles, A^{237} and A^{23456}, reacted only very weakly, if at all. There was a distinct dosage effect of the reactive alleles. The cells of individuals having a single dose of a reactive allele (e.g., A^{23}/A^{237} or A^{s}/A^{237}) were only moderately reactive, while the cells of individuals possessing a double dose of the reactive alleles A^{23}/A^{23}, A^{s}/A^{s} or A^{23}/A^{s} were very strongly reactive.—*W. E. Briles.* (Biological Abstracts)

CAMPOS, AMADO C., and C. S. SHAFFNER. (U. Maryland, College Park.) THE GENETIC CONTROL OF CHICK COMB AND OVIDUCT RESPONSE TO ANDROGEN AND ESTROGEN. *Poultry Sci. 31:* 567-571. 1952.—24 New Hampshire pullets assigned at random to 6 sire groups were used to produce 665 chicks. Each chick was injected with 0.6 mg. each of testosterone propionate and stilbestrol dissolved in sesame oil administered in 6 equal injns. over a 12-day period. The chicks were then sacrificed and records made on body, comb, and oviduct wts. Analysis of the data revealed that there were significant differences between the sire families and between dam families within sire families with respect to body wt., comb wt., and oviduct wt. Since all chicks were subjected to relatively high androgen and estrogen levels, these results indicate that these differences in wts. are the result of differences in tissue response. Heritability values for the three measurements were as follows: Body wt. 0.22, comb wt. 0.13, oviduct wt. 0.23.—*Auth. summ.* (Biological Abstracts)

FRANCIS, D. W., and A. F. KISH. (Delaware Agric. Expt. Substation, Georgetown.) OBSERVATIONS ON THE INHERITANCE OF RESISTANCE TO NEWCASTLE DISEASE IN NEW HAMPSHIRE CHICKENS. *Poultry Sci. 31:* 916. 1952.—*An abstract.* (Biological Abstracts)

GODFREY, EDWARD F., and R. GEORGE JAAP. (U. Tennessee, Knoxville, Ohio State U., Columbus.) THE INHERITANCE OF GROWTH AND ADULT BODY SIZE IN THE DOMESTIC FOWL. *Poultry Sci. 31:* 918. 1952.—*An abstract.* (Biological Abstracts)

GOWE, R. S. (Central Expt. Farm Ottawa, Ont., Canada.) RECENT INFORMATION ON THE RELATIVE EFFECT OF ENVIRONMENT AND HEREDITY ON EGG PRODUCTION. *Poultry Sci. 31:* 918-919. 1952.—*An abstract.* (Biological Abstracts)

GRIMES, J. F., and T. B. CLARK. (West Virginia U., Morgantown.) REPRODUCTIVE PERFORMANCE IN THE TURKEY. I. INFLUENCE OF KIND OF MATINGS ON HATCHABILITY. *Poultry Sci. 31:* 919. 1952.—*An abstract.* (Biological Abstracts)

HARPER, J. A., and J. E. PARKER. (Oregon State Coll., Corvallis.) OVER-LAPPING OF PROGENY RESULTING FROM CHANGING MALES IN TURKEY MATINGS. *Poultry Sci. 31:* 659-664. 1952. —Expts. in which Beltsville Small White turkey hens were artificially inseminated with semen from toms of Beltsville Small White, Broad-Breasted Bronze and Black vars. show that one double insemination (inseminations on 2 successive days) of semen from one variety of toms following previous artificial insemination of semen from another var. resulted in an overlap in progeny ranging from 24 to 58%. Whether inseminations of semen from the replacing var. were made immediately following or 11-14 days after insemination of semen of the replaced var. made little difference in the percentage of overlap. A 2d double insemination with semen from the replacing toms 11-14 days following the 1st resulted in 89.3, 95.9, 96.6, and 98.3% progeny sired by the replacing toms. Similar results were obtained when Broad Breasted Bronze hens were inseminated with semen from toms of the same var. and from Black toms.—*Authors.* (Biological Abstracts)

HAYS, F. A. (U. Massachusetts, Amherst.)
POSSIBLE EFFECTS OF SEX-LINKED GENES ON REPRODUCTION AND FECUNDITY IN RHODE ISLAND REDS. *Poultry Sci. 31:* 826-829. 1952.—R. I. Red pullets bred for high fecundity in a closed flock hatched during the breeding seasons of 1943 to 1947 were examined for evidence of sex-linked inheritance. Each year there were several male breeders that had full sisters used for breeding. In all, there were 25 brother-sister groups of daughters. Included were 49 dams having 563 daughters and 38 sires with 1609 daughters. There was no inbreeding. Fertility and hatchability records of brothers and sisters showed no significant differences. The daughters of brothers averaged slightly older at first egg than the daughters of sisters. Although the mean difference was small, there is some evidence that it was impossible to select the males for sexual maturity with the same degree of accuracy that was possible in selecting females. No evidence was found of sex-linked genes affecting either winter intensity or persistency. The annual egg production of the daughters of the brothers was significantly higher than that of the daughters of the sisters. Here is some evidence of an unknown sex-linked gene in operation. Viability as measured by the mortality rates of daughters in the laying houses did not differ significantly in the 2 groups of daughters. —*F. A. Hays.* (Biological Abstracts)

HAYS, F. A., and E. W. SPEAR. (U. Massachusetts, Amherst.)
RELATION OF AGE OF PARENTS TO MORTALITY AND SEX RATIO OF CHICKS AT EIGHT WEEKS. *Poultry Sci. 31:* 792-795. 1952.—The effect of age of parents on viability of chicks to the age of 8 weeks and the sex ratio at 8 weeks has been studied over a 5-yr. period. Of 11,373 pedigreed Rhode Island Red chicks hatched, the maximum mortality to 8 weeks was 10.29 percent with a minimum of 3.54%. Age of dams has a more pronounced effect on chick mortality than age of sires. Dam effects are probably both genetic and physiological, since the dam is responsible for the early nutrition of the chick. Sire effects are probably significant and must be genetic in nature. Age of parents appears to influence the sex ratio at 8 weeks, young parents give a lower sex ratio than yearling or older parents. The mortality rate in chicks for the first 8 weeks has a regulating effect on the sex ratio at 8 weeks. When the mortality rate is high, males succumb at a greater rate than females. If the gross mortality rate is low, both sexes appear to die at about the same rate. In general, these data indicate that the abnormally high sex ratio observed in this pedigreed flock at eight weeks is due largely to the extensive use of yearling or older breeders.—*F. A. Hays.* (Biological Abstracts)

JAAP, R. GEORGE, and HAMISH ROBERTSON. (Poultry Res. Centre, Edinburgh, Scotland.)
HORMONE SENSITIVITY IN INBRED LINES OF BROWN LEGHORNS. *Poultry Sci. 31:* 921. 1952.—*An abstract.* (Biological Abstracts)

KRUEGER, W. F., G. E. DICKERSON, Q. B. KINDER, and H. L. KEMPSTER. (U. Missouri, Columbia)
THE GENETIC AND ENVIRONMENTAL RELATIONSHIP OF TOTAL EGG PRODUCTION TO ITS COMPONENTS AND TO BODY WEIGHT IN THE DOMESTIC FOWL. *Poultry Sci. 31:* 922-923. 1952. —*An abstract.* (Biological Abstracts)

LANKFORD, LOWELL, and M. R. McCLUNG. (U. Arkansas, Fayetteville.)
HERITABILITY OF 10 WEEK WEIGHT IN A BROILER STRAIN OF CHICKENS. *Poultry Sci. 31:* 923. 1952.—*An abstract.* (Biological Abstracts)

PLUMART, PHILLIP E., and CLYDE D. MUELLER. (Kansas State Coll., Manhattan.)
A COMPARISON OF THE EFFECTS OF SEX-LINKED EARLY AND LATE FEATHERING ON GROWTH AND FEATHERING OF

CHICKS TO TWELVE WEEKS OF AGE. *Poultry Sci. 31:* 931-932. 1952.—*An abstract.* (Biological Abstracts)

ROBERTS, E., L. E. CARD, and W. E. SHAKLEE. (U. Illinois, Urbana.) INHERITANCE OF EGG WEIGHT. *Poultry Sci. 31:* 870-875. Illus. 1952.—Four inbred lines of White Leghorns were used in the study of inheritance of egg wt. Two of these lines had avg. egg wts. of 46.4 and 45.4 g. The other 2 had wts. of 60.3 and 59.8 g. The avg. egg wts. of the F_1 generation from a cross of small- and large-egg lines were intermediate. In the backcrosses of F_1 x small-egg lines, the avg. egg wt. was 1.9 g. below the avg. of the F_1 and 4.7 g. above the avg. of the 2 small-egg lines. The backcross to large-egg lines had an avg. egg wt. 4.7 g. greater than the F_1 and 2.9 g. below the avg. of the large-egg lines. The results suggest that in the birds used in this study the genes involved were incompletely dominant and males and females are of equal importance in determining egg size. No evidence of sex-linked genes was found.—*E. Roberts.* (Biological Abstracts)

SHAKLEE, W. E., C. W. KNOX, and S. J. MARSDEN. (Agric. Res. Admn., Beltsville, Md.) HERITABILITY OF EGG PRODUCTION IN BELTSVILLE SMALL WHITE TURKEYS. *Poultry Sci. 31:* 935. 1952.—*An abstract.* (Biological Abstracts)

SHAKLEE, WILLIAM E., CHARLES W. KNOX, and STANLEY J. MARSDEN. (U. S. Dept. Agric., Beltsville, Md.) INHERITANCE OF THE SEX DIFFERENCE OF BODY WEIGHT IN TURKEYS. *Poultry Sci. 31:* 822-825. 1952.—Sex differences were calculated from the 24-week body wt. records of 852 Beltsville Small White turkeys and subjected to an analysis of variance. Highly significant variations among families indicated a hereditary influence on the sex difference in body wt. A highly significant difference between the coeffs. of variation for males and females gave evidence that females of this var. were less variable in body wt. than males. Evidently strains and vars. of turkeys can be produced in which the sexual dimorphism in body wt. is greatly reduced.—*W. E. Shaklee.* (Biological Abstracts)

PHYSIOLOGY

ALMQUIST, H. J. (The Grange Co., Modesto, Calif.) EFFECTS OF MALE SEX HORMONE ON GAINS AND FEED CONVERSIONS OF HEN TURKEYS. *Poultry Sci. 31:* 747-748. 1952. —Broad Breasted Bronze and Beltsville Small White hen turkeys, 12-14 weeks of age, were given a 50 mg. pellet of testosterone propionate subcut. near the head. These hens soon assumed male appearance and behavior, which began to revert after 6 weeks. They grew faster than untreated control hens and converted feed as efficiently as control toms. The effects on growth and feed conversion are not due specifically to the male hormone.—*Author.* (Biological Abstracts)

ALMQUIST, H. J., and J. B. MERRITT. (The Grange Co., Modesto, Calif.) EFFECTS OF DIETHYLSTILBESTROL ON GAINS AND FEED CONVERSIONS OF TURKEYS. *Poultry Sci. 31:* 748-749. 1952.—Beltsville Small White turkeys, 12 weeks old, were given diethylstilbestrol pellets subcut. in the neck near the head. A 15 mg. dose improved wt. gains 14% in toms and 12% in hens as compared to controls. Efficiency of feed conversion was also improved with each sex. A 30 mg. dose was apparently excessive and the birds showed little difference from untreated controls. A 6 mg. dose was insufficient. The treatment caused noticeable excitation of both sexes. Treated birds showed slightly improved color and finish and less shrinkage when dressed. The 15 mg. dose was economically advantageous.—*Authors.* (Biological Abstracts)

BLIVAISS, BEN B. (U. Chicago.)
RESPONSE OF COMB AND PLUMAGE IN THYROIDECTOMIZED BROWN LEGHORN HENS TO HORMONE ADMINISTRATION. *Amer. Jour. Anat. 89(3):* 381-404. Illus. 1951.—The comb of thyroidectomized hens displayed a more marked growth following the simultaneous admn. of thyroxin and testosterone than with either alone, apparently due to a stimulation by thyroxin of an increase in the ovarian secretion of androgens, as well as the utilization of androgens. The amt. of thyroxin required to produce the henny feather pattern by deposition of black and brown melanin and an increase in the number of barbules was related to the growth rate of the area in question. The female feather pattern was not produced by the admn. of estradiol in doses 30 times larger than those required for its production in the capon or bilaterally-ovariectomized poulard. In thyroidectomized hens, only "female-like" modifications occurred, such as barbulation and a sparse mottling of black and brown pigment in the web. The female plumage pattern appears to result from a synergistic action of thyroid and ovarian secretions. The dose of thyroxin necessary for an acceleration of feather growth rates to normal levels was directly related to the order of growth rates in normal rather than to the order in thyroidectomized individuals. This may be a consequence of the accelerated ovarian secretion resulting from thyroxin admn. The growth rate pattern of feather areas appears to be influenced by thyroid and ovarian secretions.—*Auth.* (courtesy Wistar Bibl. Serv.)

BOULANGER, P. (Animal Dis. Res. Inst., Hull, Que.)
SEASONAL CHANGES IN THE COAGULABILITY OF THE BLOOD OF TURKEYS. *Canadian Jour. Comp. Med. and Vet. Sci. 16(6):* 222-229. 1952.—Differences in the rate and extent of clot retraction and prothrombin content of the plasma of male and female turkeys during spring and early summer were not due to changes in the female blood during laying; but rather to a prolongation of clot retraction in the male, apparently due to a reduction in prothrombin. In the fall, the differences between the coagulative activity of the blood of the 2 sexes tended to disappear due to the return of the prothrombin time of the male to the previous winter level.—*R. Gwatkin.* (Biological Abstracts)

BRUNSON, CLAYTON C., and GEORGE F. GODFREY. (Oklahoma Agric. Expt. Sta., Stillwater.)
THE EFFECT OF SOME EGG CHARACTERISTICS UPON THE HATCHABILITY OF BROAD BREASTED BRONZE TURKEY EGGS. *Poultry Sci. 31:* 909. 1952.—*An abstract.* (Biological Abstracts)

BUCKNER, G. DAVIS, W. M. INSKO, JR., ELIZABETH FAULL WACHS, and HELEN HARMS HENRY. (Kentucky Agric. Expt. Sta., Lexington.)
COMPARATIVE GROWTH AND OSSIFICATION OF STERNI AND TEN APPENDICULAR BONES OF NEW HAMPSHIRE AND RHODE ISLAND RED CHICKENS. *Poultry Sci. 31:* 909. 1952.—*An abstract.* (Biological Abstracts)

COLE, R. K., and F. B. HUTT. (Cornell U., Ithaca, N. Y.)
NORMAL OVULATION IN NONLAYING HENS. *Poultry Sci. 31:* 911. 1952.—*An abstract.* (Biological Abstracts)

ENDERS, ALFRED. (U. Freiburg.)
DIE AUSSCHALTUNG DES GERUCHSSINNES BEI DAUERVERSUCHEN MIT KÜNSTLICHES FETTEN. [THE ELIMINATION OF THE SENSE OF SMELL IN THE CASE OF PROLONGED STUDIES WITH SYNTHETIC FATS.] *Arch. exptl. Path. u. Pharmakol. 214(4):* 404-410. 1952.—Acceptability of natural and synthetic fats was tested on hens because of the high threshold for smell in these animals. Synthetic fats proved to be as acceptable as natural ones. Normal dogs made a distinction between the 2 foodstuffs, but those in which the olfactory lobe had been severed ate more synthetic food per day and for a longer time than did normal controls.—*L. W. Holm.* (Biological Abstracts)

GODFREY, GEORGE F., and C. WILLIAMS. (Oklahoma Agric. Expt. Sta., Stillwater.)
THE RELATIVE INFLUENCE OF EGG SIZE, AGE AT SEXUAL MATURITY AND MATURE BODY WEIGHT ON GROWTH TO TWELVE WEEKS OF AGE. *Poultry Sci. 31:* 918. 1952.—*An abstract.* (Biological Abstracts)

GONZALEZ CHAPEL, A., and M. ROJAS DAPORTA. (Lajas Substa., Lajas, P. R.)
INFLUENCE OF TIME OF HATCHING ON SEXUAL MATURITY OF PULLETS IN PUERTO RICO. *Jour. Agric. Univ. Puerto Rico 35(3):* 100-113. Illus. 1951.—Sexual maturity recorded on 1372 pullets of New Hampshire, White Leghorn, native and crossbreeds at Rio Piedras from 1946 to 1949 indicated that those hatched in Feb. matured earlier than those hatched in March, and those in May than those hatched in April, with differences much more pronounced than those reported elsewhere, and of definite economic importance locally in rearing for egg production.—*G. N. Wolcott.* (Biological Abstracts)

GONZALEZ CHAPEL, ANTONIO, and MANUEL ROJAS. (Lajas Substa., Lajas, P. R.)
ENVIRONMENTAL INFLUENCE ON THE EGG SIZE OF PULLETS IN PUERTO RICO. *Jour. Agric. Univ. Puerto Rico 36(2):* 115-121. Illus. April 1952.—The eggs laid by 206 pullets of different breeds and cross-breeds at the La Plata Substation in the mountains near Aibonito increased in size during the first months of laying, reaching a maximum in May and June, but decreased rapidly in size toward the end of the laying year due to high summer temps. Smaller eggs were laid at first by the early-maturing pullets than by the late-maturing pullets.—*G. N. Wolcott.* (Biological Abstracts)

GOODWIN, K., and R. K. COLE. (Cornell U., Ithaca, N. Y.)
A STRAIN DIFFERENCE IN THE GONADOTROPHIC ACTIVITY OF THE PITUITARY IN YOUNG WHITE LEGHORN MALES. *Poultry Sci. 31:* 918. 1952.—*An abstract.* (Biological Abstracts)

HAYS, F. A. (Massachusetts Agric. Expt. Sta., Amherst.)
EFFECTS OF AGE AT SEXUAL MATURITY ON BODY WEIGHT, EGG WEIGHT AND EGG PRODUCTION. *Poultry Sci. 31:* 919-920. 1952.—*An abstract.* (Biological Abstracts)

LONG, ELMO, and GEORGE F. GODFREY. (Oklahoma A. and M. Coll., Stillwater.)
THE EFFECT OF DUBBING, ENVIRONMENTAL TEMPERATURE, AND SOCIAL DOMINANCE ON MATING ACTIVITY AND FERTILITY IN THE DOMESTIC FOWL. *Poultry Sci. 31:* 665-673. 1952.—One of each of 3 pairs of brothers of different breeds was dubbed and placed in a pen of 50 New Hampshire pullets; the normal males were placed in the adjoining pen with a similar number of pullets. These 2 pens were separated by a wire partition. 4 complete days of observation showed that 82.5% of all matings occurred between 1 and 7 p.m. 25.8% of all matings occurred from 4 to 5 p.m. Observations from 4 to 5 p.m. on 32 days from Sept. 15 to Mar. 17 revealed that dubbing had no significant effect on mating activity or fertility. Environmental temps. ranging from 12-88°F. did not reduce mating activity or fertility unless the comb and wattles were injured by freezing. Injury to the comb and wattles of 1 male by freezing reduced his mating activity for 5 days. The socially dominant males were most successful in mating and siring chicks.—*G. F. Godfrey.* (Biological Abstracts)

LYNCH, JOHN E., and H. J. STAFSETH. (Michigan State Coll., East Lansing.)
ON THE CASE OF INCOMPLETE COAGULATION OF BLOOD AND GELLING OF SERUM OF TURKEYS. *Poultry Sci. 31:* 901-902. 1952.—In some electrophoretic studies on turkey blood, difficulties were encountered because of incomplete clotting and gelling of blood samples.

The high protein feed used contained only 1% alfalfa leaf meal. The alfalfa leaf meal was increased to 5% after which normal coagulation took place. Gelled and normal samples of serum showed no differences in electrophoretic pattern. It was not proved whether the low percentage of alfalfa leaf meal (vit. K) alone or this deficiency plus the presence of procaine penicillin and aureomycin supplements, possibly interfering with vit. K synthesis, caused incomplete coagulation.—*H. J. Stafseth.* (Biological Abstracts)

McCONACHIE, J. D., C. M. HUNTSMAN, and F. N. Jerome. (Ontario Agric. Coll., Guelph, Canada.)
RELATION BETWEEN RATE OF GROWTH AND LENGTH OF INCUBATION PERIOD. *Poultry Sci. 31:* 926. 1952.—*An abstract.* (Biological Abstracts)

MORENG, ROBERT E., and REECE L. BRYANT. (North Dakota Agric. Coll., Fargo.)
THE HATCHING POWER OF CHICKEN EMBRYOS AS AFFECTED BY LOW TEMPERATURE EXPOSURE. *Poultry Sci. 31:* 928. 1952.—*An abstract.* (Biological Abstracts)

OLSEN, M. W., and STANLEY J. MARSDEN. (U. S. Dept. Agric., Beltsville, Md.)
PRE-SEASONAL MOLT IN MALE TURKEYS. *Poultry Sci. 31:* 714-722. 1952.—Beltsville Small White turkey males receiving morning lights were observed to undergo a preseasonal molt. Tests were conducted to determine the role of light as a cause of this early molt. Groups of 8 males 27 and 33 weeks of age were placed in each of 7 pens on Dec. 4, 1950. Six of these groups were given morning lights starting at 4:00 a.m., while the remaining pen served as an unlighted control. Male birds exposed to 60-watt lights and fed a standard turkey ration started to molt 10-12 weeks after the beginning of the expt. Avg. losses in body wt. of from 12 to 25% were recorded during the period of molt. Males exposed to 40-watt lights started a partial molt at the same time as the 60-watt group but did not go into a general molt until approx. 4 weeks after the latter. Unlighted males began a general molt about May 21. Onset of molt was delayed and its intensity reduced in the case of birds exposed to 60-watt lights but receiving thiouracil in their diet; however, both fertility and hatchability were adversely affected. It is concluded that light, working through the pituitary and indirectly on the thyroid, was the external stimulus in this instance which resulted in the early molt of turkey males.—*Authors.* (Biological Abstracts)

PACE, D. M., D. F. MORAVEC, and F. E. MUSSEHL. (U. Nebraska, Lincoln.)
PHYSIOLOGICAL CHARACTERISTICS OF TURKEY SEMEN. 1. EFFECT OF TYPE OF DILUENT AND DEGREE OF DILUTION ON DURATION OF MOTILITY IN TURKEY SPERMATOZOA. *Poultry Sci. 31:* 577-580. 1952.—Turkey semen contains measurable amts. of fructose. Turkey spermatozoa live longer "in vitro" when fructose is added to the diluent. The mean fructose content of turkey semen was approx. 60 mg. %.—*Authors.* (Biological Abstracts)

PHILLIPS, W. E. J., R. H. COMMON, and W. A. MAW. (McGill U., Montreal, Canada.)
SOME EFFECTS OF PROGESTERONE ON THE RESPONSE OF THE IMMATURE PULLET TO ESTROGEN, AND SOME OBSERVATIONS ON THE EFFECTS OF GONADAL HORMONES ON THE AVIAN SPLEEN AND KIDNEY. *Canadian Jour. Zool. 30(4):* 201-207. 1952.—Progesterone depressed the hypertrophy of the immature pullet's oviduct evoked by estrogen, but did not significantly affect the responses of liver wt., total liver crude protein, and serum Ca level evoked by estrogen. Progesterone did not affect the increases of liver pentose nucleic acid and desoxypentose nucleic acid evoked by estrogen. Testosterone propionate by itself, at the levels used, did not affect the amts. or ratios of liver pentose nucleic acid and desoxypentose nucleic

acid. Estrogen greatly reduced spleen wt., and progesterone significantly reduced this effect of estrogen. Testosterone did not affect spleen wt. In the expt. descr. estrogen increased kidney wt. significantly; progesterone tended to reduce this effect, but not significantly.—*Auth. abst.* (Biological Abstracts)

RAUCH, WALTER. (Res. Inst. Breeding of Small Domestic Animals, Celle, Germany.)
THE INFLUENCE OF EGG-SHELL POROSITY ON THE NUMBER OF CHICKENS HATCHED FROM INCUBATING EGGS. *Poultry Sci. 31:* 589-594. 1952.—An electrical method of measuring the porosity of egg shells is described. The mean pore diam. in the shells of eggs which hatch is less than in shells from non-hatching eggs.—*H. Branion.* (Biological Abstracts)

ROMIJN, C., K. F. FUNG, and W. LOKHORST. (State U., Utrecht.)
THYROXINE, THIOURACIL AND EMBRYONIC RESPIRATION IN WHITE LEGHORNS. *Poultry Sci. 31:* 684-691. 1952.—The air spaces of incubating eggs were injd. on the 8th day with different concns. of thyroxine and thiouracil and the embryonic metabolic rate detd. Both compounds had a significant effect, thyroxine resulting in increased rate and thiouracil in a decreased rate.—*H. Branion.* (Biological Abstracts)

SKOGLUND, W. C., K. C. SEEGAR, and A. T. RINGROSE. (U. Delaware, Newark.)
GROWTH OF BROILER CHICKS HATCHED FROM VARIOUS SIZED EGGS WHEN REARED IN COMPETITION WITH EACH OTHER. *Poultry Sci. 31:* 796-799. 1952.—New Hampshire chicks were hatched from various sized eggs ranging from 18 ounces per dozen up to 30 ounces. The chicks were reared together under practical conditions to 12 weeks in order to determine if the smaller chicks could compete successfully with the larger chicks from the standpoint of growth and mortality. At 12 weeks of age the heaviest birds were from eggs weighing 25 ounces or above. In respect to mortality, there was a trend toward a higher rate in the sizes under 22 ounces. Based on the economic returns, the data indicated that chicks from eggs weighing less than 22 ounces per dozen will not make as profitable broilers as chicks from larger eggs.—*W. C. Skoglund.* (Biological Abstracts)

STADELMAN, W. J., L. S. JENSEN, and MARTHA CYRUS. (State Coll. Washington, Pullman.)
THE RELATIONSHIP OF SHELL COLOR TO INCIDENCE OF BLOOD AND MEAT SPOTS IN HENS' EGGS. *Poultry Sci. 31:* 855-856. 1952.—The relationship of shell color to incidence of blood and meat spots in hens' eggs was studied with eggs from White Olympians. This breed of chickens produces eggs with shell colors ranging from white to dark brown. Eggs laid by this flock in Jan. and Oct., 1951, and Jan., 1952, were broken out within 3 days after being laid and examined for incidence of blood spots and meat spots. No relationship was found between shell color and incidence of blood spots or between incidence of blood spots and meat spots. A close relationship was found between shell color and the color of meat spots with a significant correlation coeff. at the 1% level. In this study, a correlation coeff. of —0.635 was found between white meat spots and colored meat spots with significant correlation coeffs. at the 1% level. The incidence of meat spots is relatively constant for this flock with the shell color closely related to the color of the meat spots. These observations suggest that meat spots and blood spots are distinct entities.—*W. J. Stadelman.* (Biological Abstracts)

STURKIE, PAUL D. (Rutgers U., New Brunswick, N. J.)
THE PLACE OF PHYSIOLOGY IN THE TEACHING AND RESEARCH PROGRAMS OF POULTRY DEPARTMENTS. *Poultry Sci. 31:* 937-938. 1952.—*An abstract.* (Biological Abstracts)

WEAKLEY, C. E. III, and C. S. SHAFFNER. (U. Maryland, College Park.)
THE FERTILIZING CAPACITY OF DILUTED CHICKEN SEMEN. *Poultry Sci. 31:* 650-654. 1952.—Natural fowl semen serum was used to dilute whole semen in ratios varying from 1:3 to 1:80 and the fertility resulting from insemination with diluted semen compared with that secured with undiluted semen. Fertility was recorded for 2 weeks following a single insemination with 0.1 ml. of semen. Semen diluted as much as 1:10 provided fertility that compared favorably with that from undiluted semen. Dilutions greater than 1:10 showed a marked decrease in fertilizing capacity and the decrease in general was proportional to the dilution.—*C. S. Shaffner.* (Biological Abstracts)

WILSON, W. O., JOHN P. HILLERMAN, and WILLIAM H. EDWARDS. (U. California, Davis.)
THE RELATION OF HIGH ENVIRONMENTAL TEMPERATURE TO FEATHER AND SKIN TEMPERATURES OF LAYING PULLETS. *Poultry Sci. 31:* 843-846. 1952.—A hardy dermal radiometer and a touch thermocouple were used to record skin temps. at various locations on White Leghorn and New Hampshire pullets. Above 90° to 95° environmental temp., the hen is no longer able to lose heat from her body feathers by radiation or convection, but she can still lose a small amt. of heat from unfeathered portions of her body. Most of the cooling would be by evaporation or conduction.—*W. O. Wilson.* (Biological Abstracts)

WILSON, WILBOR O., and JOHN P. HILLERMAN. (U. California, Davis.)
METHODS OF COOLING LAYING HENS WITH WATER. *Poultry Sci. 31:* 847-850. 1952.—White Leghorn hens kept at high environmental temps. of about 90°F. were cooled by immersing in water, mist spraying, and head wetting. Immersing in 75°F. water reduced the body temp. about 1°F. Mist spraying reduced body temp. about 0.5°F., and head wetting reduced temp. about 0.2°F. Cooling effect was nearly gone at end of 2 hrs. The greater the drop in temp., the more lasting the cooling effect.—*W. O. Wilson.* (Biological Abstracts)

WOLBACH, S. BURT (The Children's Hosp., Boston), **and D. MARK HEGSTED.** (Harvard Med. Sch., Boston.)
ENDOCHONDRAL BONE GROWTH IN THE CHICK. *Arch. Pathol. 54(1):* 1-12. 1952.—Endochondral bone growth in young chicks, 18-24 days old, is descr. and compared with and contrasted to endochondral bone growth in mammals. (Biological Abstracts)

NUTRITION

ALLEN, C. E., and DOROTHY S. DOW. (Sci. Serv., Dom. Dept. Agric., Ottawa.)
THE BIOLOGICAL ASSESSMENT OF RAPESEED OIL MEAL AS A DIETARY COMPONENT. *Sci. Agric.* [*Ottawa*] *32*(7): 403-410. 1952.—Rapeseed oil meal at levels of 10, 15, and 25% of the ration was fed to chicks of various breeds for periods up to 4 weeks. The response was characterized by marked thyroid hyperplasia and accelerated body wt. gain accompanied by feed efficiency. Because the long-term feeding of such a potent goitrogenic material might be harmful, its application could not be indiscriminate without a means of control. Neither cold water extraction nor heat treatment of the meal was found to be an adequate means of control but either hot water extraction or the addition of iodine in an amount as low as 7.5 ppm. was found to be very effective. In general, the rapeseed diets produced heavier birds than the corresponding controls and this was true whether the meal was admixed in the ration in its original form or after removal or neutralization of most of the goitrogen. The superior effect of rapeseed oil meal was evidently not due either to the protein level or the productive energy value of the diet. —*Authors.* (Biological Abstracts)

ANDERSON, G. W., S. J. SLINGER, and W. F. PEPPER. (Ontario Agricultural Coll., Guelph, Ont., Canada.)
EFFECT OF DIETARY MICROORGANISMS ON THE GROWTH AND CECAL FLORA OF CHICKS. *Poultry Sci. 31:* 905. 1952.—An abstract. (Biological Abstracts)

BAKALA, F. (Vet. Univ. Brno, Czechoslovakia.)
VLIV PRIKRMOVANI VITAMINU A NA NOSNOST, VETSI OPLOZENI, LIHNIVOST A OBSAH VITAMINU A VE VEJCICH U SLEPIC. [ADDITION OF VITAMIN A TO FEED AND ITS INFLUENCE ON LAYING, FERTILITY, INCUBATION AND ITS AMOUNT IN CHICKEN EGGS.] *Spisy Vysoké Skoly Vet. Brno 29 (Sign. F 180):* 1-12. 1951.—The feeding of vit. A increased egg production during the 2d yr. of production. The exptl. group of birds showed a better fertility (31.9%) and a higher hatchability (42.2%) than the control group, and the content of vit. A in liver and in eggs of the exptl. group was higher than in the control group.—*M. Opichal.* (Biological Abstracts)

BALLOUN, STANLEY L., and ELTON L. JOHNSON. (Iowa State Coll., Ames.)
UNDERHEATED SOYBEAN OIL MEAL INCREASES BLOOD CLOTTING TIME OF CHICKS. *Poultry Sci. 31:* 905-906. 1952.—*An abstract.* (Biological Abstracts)

BEARSE, G. E., L. R. BERG, C. F. McCLARY, and V. L. MILLER. (Western Washington Expt. Sta., Puyallup, Wash.)
THE EFFECT ON CHICK GROWTH AND FEED EFFICIENCY OF PELLETING RATIONS OF DIFFERENT FIBER LEVELS. *Poultry Sci. 31:* 907. 1952.—*An abstract.* (Biological Abstracts)

BIELY, J., B. E. MARCH, and D. F. SMITH. (U. British Columbia, Vancouver.)
THE EFFECT OF FEEDING ANTIBIOTICS ON THE CARBOHYDRATE AND PROTEIN REQUIREMENTS OF THE CHICK. *Poultry Sci. 31:* 863-870. 1952.—Studies of the growth stimulating effects of aureomycin and penicillin in chicks fed rations containing various levels of available carbohydrate, protein, lysine and tryptophan indicated that antibiotics do not have a sparing action on the carbohydrate requirements of the chick; do not lower the dietary level of protein required by the chick; and have a greater stimulatory action with rations which are well balanced in amino acids than with rations deficient in some amino acid. In order to take full advantage of the growth-stimulating properties of antibiotics, it is necessary to provide a diet of high energy and optimum protein content, as well as one well balanced in amino acids.—*From auth. summ.* (Biological Abstracts)

BIRD, H. R. (U.S. Dept. Agric., Beltsville, Md.)
ANTIBIOTICS, ARSENICALS AND SURFACTANTS. *Feedstuffs 24(38):* 60-61. 1952.—Antibiotics stimulate growth in young chickens and turkeys, producing the greatest response up to 8 weeks, but persisting in turkeys through 26 weeks. The use of antibiotics during the growing period of pullets produces no demonstrable effects on the pullet at 20 weeks, but pullets fed an antibiotic in the growing mash produced eggs which hatched much higher after the birds had been on a B_{12}-deficient laying ration for almost a year. Chicks grown in new environment without antibiotic grew more rapidly than those in an old environment with an antibiotic in the diet. This is evidence that the antibiotics function in growth promotion by altering the flora of the intestinal tract. Two phenylarsonic acids are in general use in broiler rations. These are 3-nitro, 4-hydroxyphenyl-arsonic acid, which is most effective at the 0.005% level; and arsanilic acid at the 0.009% level. Accumulation of arsenic in the tissues does not appear to be a serious problem, but these compounds must be handled with care. The use of surfactants as growth promotants is not indicated until more evidence has been accumulated.—*H. L. Wilcke.* (Biological Abstracts)

BIRD, H. R., R. J. LILLIE, and J. R. SIZEMORE. (U.S. Dept. Agriculture, Beltsville, Md.)
ENVIRONMENT AND STIMULATION OF CHICK GROWTH BY ANTIBIOTICS. *Poultry Sci 31:* 907. 1952.—*An abstract.* (Biological Abstracts)

BIRD, H. R. (U. S. Dept. Agric., Beltsville, Md.)
WHAT HAVE WE LEARNED ABOUT ANTIBIOTICS AND ARSENICALS IN FEEDS? *Feedstuffs 24(41):* 18-22. 1952.—Antibiotics are most effective as growth stimulants in feeds for growing non-ruminants, with max. effects being evident at 6-8 weeks of age. However, growth increases are still evident at marketing ages. It is not desirable to withdraw antibiotics from the ration at a time when environmental changes occur. There seems to be no advantage to adding an antibiotic to the diet of breeders unless that diet is deficient. Chickens that are germ-free, or those kept in a new environment do not respond to antibiotics to a measurable degree. The phenylarsonic acid derivatives in use as growth stimulants are 3-nitro, 4-hydroxyphenylarsonic acid and arsanilic acid. The most effective level of the former is .005% and the level of .02% is toxic. Na arsenilate is less toxic than the 3-nitro, 4-hydroxyphenylarsonic acid, but must be handled carefully. Arsenic apparently does not accumulate in the tissues beyond negligible amts.—*H. L. Wilcke.* (Biological Abstracts)

BLETNER, J. K., T. B. CLARK, C. E. WEAKLEY, JR., and A. H. VANLANDINGHAM. (West Virginia U., Morgantown.)
THE EFFECT OF SULFAQUINOXALINE IN DIFFERENT RATION FORMULATIONS ON GROWTH AND FEED EFFICIENCY OF COCCIDIA-FREE CHICKS. *Poultry Sci. 31:* 907. 1952.—*An abstract.* (Biological Abstracts)

BOLIN, D. W., EARLE W. KLOSTERMAN, KERMIT SCHLAMB, and REECE L. BRYANT. (N. Dakota Agric. Coll., Fargo.)
CHICK GROWTH RESPONSE TO DIFFERENT LEVELS OF METHIONINE AND PROTEIN SUPPLEMENTS ADDED TO A LOW METHIONINE DIET. *Poultry Sci. 31:* 700-707. 1952.—One week old chicks were placed on a basal ration for 16 days consisting of pea, meat and alfalfa meals as the sole source of protein. The chicks were fed different levels of DL-methionine added to the basal ration. Per cent daily gain of these chicks was plotted against the different levels of DL-methionine of a log-log graph. The method of the "least squares" was used in fitting the standard growth curve on this graph. In the same exptl. feeding trials other lots of chicks were fed the basal ration plus different protein supplements. The % daily gain of these chicks was compared to the standard growth curve and the corresponding amt. of DL-methionine contributed to the basal ration by the protein supplement was detd. Cereal proteins added to a low methionine ration gave a larger increase in chick gains than can be accounted for from the methionine found in their proteins. Other factors are present in cereals which affect the utilization or requirement of the growing chick or the methods used for the detn. of methionine do not give the true methionine content, especially in starchy materials.—*D. W. Bolin.* (Biological Abstracts)

BRANION, H. D., and G. W. ANDERSON. (Ontario Agric Coll. Guelph, Canada.)
ANTIBIOTICS AND THE GROWTH OF DUCKS. *Poultry Sci. 31:* 908. 1952.—*An abstract.* (Biological Abstracts)

BUCKNER, G. DAVIS, W. M. INSKO, JR., AMANDA HARMS HENRY, and ELIZABETH FAULL WACHS. (U. Kentucky, Lexington.)
THE INFLUENCE OF VITAMIN D ON THE GROWTH AND CALCIFICATION OF THE STERNI, TIBIAE, FEMORA, AND METATARSI OF NEW HAMPSHIRE COCKEREL. *Poultry Sci. 31:* 628-632. 1952.—Three lots of New Hampshire cockerels were fed ad libitum a basal all-mash vitamin D deficient ration. Lot 1 received the

vitamin D deficient ration while lots 2 and 3 received that ration supplemented respectively with the optimum and 10 times the optimum quantity of vitamin D. At 6, 10, 14, and 18 weeks, 5 cockerels were weighed, killed and their tibiae, femora, metatarsi and sterni dissected out. At 6 weeks, the avg. wt. of cockerels in lots 2 and 3 were nearly equal, and approx. 25% heavier than in lot 1. At 18 weeks, the avg. wts. of cockerels in lots 2 and 3 were nearly equal, and 2.3 times heavier than those in lot 1. At 18 weeks, the avg. wts. and lengths of bones considered in lots 2 and 3 were nearly equal and 3 times heavier and 1.5 times longer than in lot 1. Comparative rates of calcification of the bones mentioned in the 3 lots are discussed. Vitamin D supplements directly influenced the rates of growth of the cockerels and the calcification, wts., and lengths of the bones considered. Wt. and calcification of the bones were influenced more than length.—*G. D. Buckner.* (Biological Abstracts)

CARLSON, C. W., D. G. JONES, R. A. WILCOX, and WM. KOHLMEYER. (South Dakota Agric., Expt. Sta., Brookings.)
ANTIBIOTICS IN BREEDER DIETS. *Poultry Sci. 31:* 910. 1952. —*An abstract.* (Biological Abstracts)

CARVER, DONALD S., and ELTON L. JOHNSON. (Iowa State Coll., Ames.)
UNIDENTIFIED GROWTH FACTORS IN VEGETABLE OILS AND FATTY ACID CONCENTRATES. *Poultry Sci. 31:* 910-911. 1952. —*An abstract.* (Biological Abstracts)

CRAVENS, W. W. (U. Wisconsin, Madison.)
ROLE OF ANTIBIOTICS IN POULTRY FEEDS. *Flour and Feed 53(2):* 12-13. 1952.—Vitamin B_{12}, supplementing an all-vegetable chick ration, gives a 10-20% increase in growth rate. Further supplementation with antibiotics provides an added 10% increase. Maximum rate is obtained when both are added to fish meal. Aureomycin, bacitracin, penicillin and terramycin are about equally effective and all are superior to streptomycin. Turkey poults respond more to antibiotics and less to B_{12}, as compared with chicks. Feeding of antibiotics is of little benefit after the birds are 8 weeks old.—*M. J. Blish.* (Biological Abstracts)

DAVIS, R. L., G. M. BRIGGS, and H. J. SLOAN. (U. Minnesota, St. Paul.)
THE MODULUS OF GROUND CORN IN A CORN-SOYBEAN OILMEAL CHICK STARTING RATION. *Poultry Sci. 31:* 745-746. 1952. —Chicks were fed from day-old to 5 weeks on rations containing 61% corn ground in a hammer mill with different size screens. Following are the avg. wts. of replicate groups with the corresponding screen sizes; 2/32″-354 g., 5/32″-325 g., 6/32″-311 g., 8/32″-303 g., 12/32″-305 g., 16/32″-307 g. The coeffs. of variation for the 6 groups were, respectively, 13.2, 16.8, 16.8, 25.3, 27.8, and 25.6.—*H. J. Sloan.* (Biological Abstracts)

DRIGGERS, J. CLYDE, GEORGE K DAVIS, and N. R. MEHRHOF.
TOXIC FACTOR IN CITRUS SEED MEAL. EXTRACTION, CHICK FEEDING TRIALS AND CHEMICAL CHARACTERISTICS. *Bull. Florida Agric. Expt. Sta. 476:* 5-36. 1951.—Expts. including 20% commercially prepd. citrus seed meal in the diet of White Leghorns demonstrated that, as now prepd., this by-product of the citrus canning and citrus seed oil industries is unsatisfactory for chick growth. A high mortality resulted during the first 3 weeks in each of these studies. Enlarged gall bladder and sometimes mottled liver, ascites and congestion of the intestinal tract were the manifestations observed. The primary deleterious factor was a white crystalline compound soluble in acetone and 95% ethyl alcohol but insoluble in water and diethyl ether, probably limonin, the bitter principle of the seed. In certain expts. there were indications that a 2d factor soluble in alcohol after separate extraction with ether and acetone was a contributing cause of the unsatisfactory results. Dehydrated citrus seed meal, when extracted successively with diethyl ether, acetone and 95% ethyl alcohol and added to a good chick mash at a level of nearly 20%, gave satisfactory results. Also,

when used to replace slightly above 20% soybean meal in the Univ. of Florida chick-starting diet, completely detoxified citrus seed meal proved quite satisfactory as a source of vegetable protein for chicks to 5 and 6 weeks old.—*Auth. summ.* (Biological Abstracts)

FISHER, H., E. P. SINGSEN, and L. D. MATTERSON. (U. Connecticut, Storrs.)
THE INFLUENCE OF FEED EFFICIENCY ON THE PHOSPHORUS REQUIREMENT FOR GROWTH AND BONE CALCIFICATION IN THE CHICK. *Poultry Sci. 31:* 916. 1952.—*An abstract.* (Biological Abstracts)

FOX, T. W., and B. B. BOHREN. (Purdue Agric. Expt. Sta., Lafayette, Ind.)
FEED EFFICIENCY AMONG BREEDS OF CHICKENS AND ITS RELATIONSHIP TO RATE OF GROWTH. *Poultry Sci. 31:* 916. 1952.—*An abstract.* (Biological Abstracts)

GRAU, C. R., and P. A. ZWEIGERT. (U. California, Berkeley.)
STUDIES OF PURIFIED DIETS FOR EGG PRODUCTION AND HATCHABILITY. *Poultry Sci. 31:* 919. 1952.—*An abstract.* (Biological Abstracts)

GERRY, R. W., J. R. SMYTH, and C. E. HOWES. (Maine Agric. Expt. Sta., Orono.
HIGH EFFICIENCY RATIONS FOR REPLACEMENT STOCK AND LAYING HENS. *Poultry Sci. 31:* 917. 1952.—*An abstract.* (Biological Abstracts)

HASHIZUME, T.
DIGESTION TRIALS ON VARIOUS FEEDS BY POULTRY. [IN JAPANESE WITH ENGLISH SUMM.] *Bull. Natl. Inst. Agric. Sci.* [*Yahagi, Japan*] *Ser. G. 2:* 71-96. 1951.—The chem. composition and digestion coeffs. of sweet potato (raw and steamed), sweet potato leaves and vines (dried and fermented), corn bran, milo bran, fermented feed, milt (dried seminal vesicles of herring, a by-product), and tea residue, detd. by a series of digestion trials with poultry, are given in tables.—*From auth. summ.* (Biological Abstracts)

HASHIZUME, T., H. NOZAKI, K. HIROE, S. HORII, Y. TAKEI, H. MORIMOTO, and Y. KAISHIO.
CALCIUM METABOLISM IN THE LAYING HEN. I. ABSORPTION, EXCRETION AND RETENTION OF RADIOACTIVE Ca^{45}. [IN JAPANESE WITH ENGLISH SUMM.] *Bull. Natl. Inst. Agric. Sci.* [*Yahagi, Japan*] *Ser. G. 4:* 129-136. 1952.—The absorption, excretion and retention of radioactive Ca^{45} after the admn. of $Ca^{45}Cl_2$ containing about 50 μc were studied in 2 White Leghorns and 1 hybrid. Total Ca and Ca^{45} of the eggs produced and urine and feces excreted in 5 days after the admn. were analyzed and changes of Ca^{45} activity in the whole blood and excreta during the 1st 72 hrs. were estimated. The activity in the whole blood during the 1st 72 hrs. was very remarkable until 20 hrs. later, staying at the low level thereafter; in the other 2 hens, which laid no eggs, the decrease was rapid until 8-14 hrs., then became gradual until 44 hrs., reaching also the low level. The daily amt. of Ca^{45} in excreta as well as its excretion rate in 72 hrs. after the admn. were examined. In the 2 non-laying hens 30-40% of the dose was excreted during the 1st 4 hrs., then the rate retarded, 56-70% being excreted until 24 hrs. after; while in the laying hen on the 2d and 3d days the rate was very slow, the amt. excreted being 1% and 39% in 4 and 24 hrs., respectively. Thereafter the rate was also slower in the latter than in the former. Most of the Ca^{45} excreted during 5 days was excreted on the 1st day, then the amt. decreased suddenly on the 2d day, and became constant afterwards. The total amt. excreted in 5 days reached 78% in the non-laying hen, 65% in the hen which produced one egg, and o[illegible] 40% in the hen which laid 3 eggs. As for the 3 eggs produced by the

laying hen, the 1st egg laid 25 hrs. after the treatment contained about 40% of Ca^{45} given, while the successive eggs showed much lower values. A tendency of the increase of Ca^{45} was recognized in egg whites, in yolk the tendency was reversed. When hens were laying eggs, most of the Ca^{45} absorbed in the body was transferred directly to the eggs and the other part which reached also to the identical or successive eggs afterwards was deposited in bones or other organs. The amt. of retained Ca^{45} in the body after 5 days was 30% in the non-laying hen, 22% in the hen which laid an egg and 14% in the hen which produced 3 eggs during the time. The greater part of unabsorbed Ca^{45} was evacuated in the excreta after a few hrs., the excretion rate being decreased thereafter.—*From auth. summ.* (Biological Abstracts)

HEUSER, G. F., and M. L. SCOTT. (Cornell U., Ithaca, N. Y.)
BOWED LEGS IN DUCKS, A NUTRITIONAL DISORDER. *Poultry Sci. 31:* 920. 1952.—*An abstract.* (Biological Abstracts)

HEUSER, G. F., and L. C. NORRIS. (Cornell U., Ithaca, N. Y.)
SOME RESULTS OF FEEDING ANTIBIOTICS TO CHICKENS. *Poultry Sci. 31:* 857-862. 1952.—Variability in growth stimulation has been obtained for the same antibiotic in different expts. Improved growth was obtained with as litle as 1.25 ppm. of the antibiotic. Penicillin gave the most consistent and slightly better results than the other antibiotics fed although in individual trials equal responses were also obtained from aureomycin, terramycin, and bacitracin. The greatest relative growth stimulation of chicks due to antibiotics was found to occur during the first 4 weeks. A greater relative growth response with antibiotics was obtained in chicks fed vegetable protein rations than in those fed rations containing animal protein. In general the best wt. was obtained with rations containing animal protein supplemented with antibiotics. Considerable variation was observed in feed efficiency. The trend, however, showed that less feed was required to produce a pound of gain with antibiotics. This was especially true when there was an appreciable growth stimulation. No measurable difference was observed under the conditions of the expts. in the uniformity of the chicks as expressed by the coeff. of variability.—*G. F. Heuser.* (Biological Abstracts)

HEYWANG, BURT W. (Bureau Animal Indust., U. S. Dept. Agric., Glendale, Arizona.)
THE EFFECT OF ANTIBIOTICS ON THE GROWTH OF WHITE LEGHORN PULLETS. *Poultry Sci. 31:* 581-586. 1952.—In a series of 4 expts. started with day-old White Leghorn pullets, different groups were fed the basal diet containing 19.5% cottonseed meal and 7.5% sardine meal as the main sources of protein, or the basal diet supplemented with 3-nitro, 4-hydroxyphenyl arsonic acid or with a commercial product containing vitamin B_{12} alone or vitamin B_{12} together with streptomycin, penicillin, procaine penicillin, or aureomycin. The diets were fed to pullets on straw litter in houses in the first 2 expts., but in the 3d and 4th expts. each diet was fed to one group on straw litter in a house and to another group on a wire floor in a battery brooder. The 2d expt. was in progress during hot weather, but the other 3 were in progress during cool or moderate weather. The results indicate that the basal diet contained ample vitamin B_{12} for growth. In all 4 expts., at the end of 8 weeks, the increased avg. wt. resulting from supplementing the basal diet with any of the antibiotics seems small, ranging from none to about 8%. About the same relative increase in avg. wt. would occur during both hot and cool weather. When the data from all 4 expts. are considered collectively, there are no consistent appreciable differences between the efficiency of diet utilization of the pullets fed the basal diet and those fed the basal diet supplemented with any of the antibiotics.—*Auth. summ.* (Biological Abstracts)

HILL, D. C., H. D. BRANION, and S. J. SLINGER. (Ontario Agric. Coll., Guelph, Canada.)
INFLUENCE OF ENVIRONMENT ON THE GROWTH RESPONSE OF CHICKS TO PENICILLIN. *Poultry Sci. 31:* 920. 1952.—*An abstract.* (Biological Abstracts)

HILL, D. C., and H. D. BRANION. (Ontario Agric. Coll., Guelph, Canada.)
INFLUENCE OF DIET COMPOSITION ON THE RESPONSE OF CHICKS TO VITAMIN B_{12}. *Poultry Sci. 31:* 892-897. 1952.—Addition of corn oil and extra protein to a diet deficient in vit. B_{12} influenced the growth response of chicks to dietary supplements of the vit. The addition of 5% of corn oil to a diet containing approx. 20% protein did not increase the response and only a moderate increase occurred when the protein level was raised to approx. 30% with no added corn oil. However, a greater than 2-fold response was observed when both extra corn oil and protein were included in the diet. This effect was partly due to a marked depression in growth when the vit. B_{12} deficient "high" corn oil-"high" protein diet was fed.—*D. C. Hill.* (Biological Abstracts)

KRATZER, F. H. (U. California, Davis.)
THE EFFECT OF DIETARY MOLYBDENUM UPON CHICKS AND POULTS. *Proc. Soc. Exptl. Biol. and Med. 80(3):* 483-486. 1952.—Various levels of Mo and Cu were added to practical starting rations for chicks and poults. Growth of chicks and poults was depressed by approx. 25% by addition of 300 ppm. Mo. Addition of Cu to the rations containing Mo caused slightly improved growth. There was no evidence of anemia or diarrhea in birds on the high-Mo diets. Poults fed high-Mo rations for over 4 weeks had normal feather pigmentation.—*F. H. Kratzer.* (Biological Abstracts)

KRATZER, F. H. (U. California, Davis.)
THE EFFECT OF LIVER CONCENTRATE AND AUREOMYCIN UPON THE GROWTH OF CHICKS. *Poultry Sci. 31:* 889-901. 1952.—Methanol-extracted soybean oil meal was used as the protein source in an otherwise purified basal ration fed to S. C. White Leghorn cockerel chicks from a commercial hatchery. Definite growth responses were obtained from the addition of liver concentrate or aureomycin to the basal ration in 3-week feeding trials. Liver concentrate and aureomycin together produced greater gains than either alone.—*F. H. Kratzer.* (Biological Abstracts)

LEONG, K. C., and JAMES McGINNIS. (State Coll. Washington, Pullman.)
AN ESTIMATE OF THE METHIONINE REQUIREMENT FOR EGG PRODUCTION. *Poultry Sci. 31:* 692-695. 1952.—An expt. was conducted to determine the methionine requirement of laying hens. Records were kept on egg production, body wt. gain, egg size, and hatchability of fertile eggs. The level of methionine required for supporting maximum egg production, body wt. gain and egg size appeared to be approx. 0.28% in the presence of 0.25% cystine.—*Authors.* (Biological Abstracts)

McGREGOR, H. I., R. M. BLAKELY, and R. W. ANDERSON. (Dominion Expt. Sta., Swift Current, Sask., Canada.)
GROWTH RESPONSE OF TURKEY POULTS TO PROCAINE PENICILLIN ADDED TO THE DIET AT VARIOUS AGES. *Poultry Sci. 31:* 924-925. 1952.—*An abstract.* (Biological Abstracts)

MADSEN, I. L. (Colorado A. and M. Coll., Fort Collins.)
THE NUTRITIONAL VALUES OF BEET SUGAR MOLASSES BY-PRODUCTS. *Poultry Sci. 31:* 925. 1952.—*An abstract.* (Biological Abstracts)

MATTERSON, L. D., E. P. SINGSEN, LOIS DECKER, and ANNA KOZEFF. (U. Connecticut, Storrs.)
COMBINATIONS OF ANTIBIOTICS AS GROWTH STIMULANTS IN CHICK STARTING AND GROWING RATIONS. *Poultry Sci. 31:* 926. 1952.—*An abstract.* (Biological Abstracts)

MATTERSON, L. D., E. P. SINGSEN, LOIS DECKER, and ANNA KOZEFF. (U. Connecticut, Storrs.)
THE INFLUENCE OF PROTEIN LEVEL, AUREOMYCIN AND VITAMIN B_{12} ON THE GROWTH AND FEED EFFICIENCY OF CHICKS. *Poultry Sci. 31:* 940-941. 1952.—*An abstract.* (Biological Abstracts)

MILLIGAN, J. L., G. R. ARSCOTT, and G. F. COMBS. (U. Maryland, College Park.)

VITAMIN B_{12} REQUIREMENT OF NEW HAMPSHIRES. 2. INFLUENCE OF MATERNAL RATION ON REQUIREMENT OF PROGENY. *Poultry Sci. 31:* 830-837. 1952.—Expts. were conducted on the progeny from dams receiving diets containing different levels and sources of vit. B_{12}. Coprophagy was reduced to a minimum throughout these trials for both dams and progeny. The chick's dietary requirement for vit. B_{12} to 4 wks. was shown to be inversely related to the level of vit. B_{12} furnished in the maternal ration. Vit. B_{12} was required in the chick ration or maternal ration for good viability to 4 wks. and for satisfactory feathering. When 4 μg. of vit. B_{12} were added per kg. of maternal ration, both the viability and feathering of progeny were satisfactory. When no vit. B_{12} was added to the vit. B_{12}-deficient maternal ration, 9 μg. of vit. B_{12} were required per kg. of chick ration to prevent excessive mortality, while 3 μg. were adequate for satisfactory feathering. Chicks from dams fed, 0, 4, 8, and 16 μg. of supplemental vit. B_{12} per kg. of feed grew satisfactorily when fed 27, 12, 3, and 0 μg. of added vit. B_{12}, resp., per kg. of chick ration. A level of 4.4 to 6 μg./kg. is considered satisfactory for practical starting rations based upon the results of this study. Chick growth results indicate that vit. B_{12} furnished through the maternal ration to the progeny is more efficiently utilized than that supplied directly by the chick ration. Furthermore, crude concentrates added to the maternal ration differ with respect to the availability of vit. B_{12} for transmission by the hen to the egg.—*G. H. Arscott.* (Biological Abstracts)

MILLIGAN, J. L., G. H. ARSCOTT, and G. F. COMBS. (U. Maryland, College Park).

VITAMIN B_{12} REQUIREMENTS OF NEW HAMPSHIRES. 1. REQUIREMENT OF LAYING PULLETS. *Poultry Sci. 31:* 595-603. 1952.—Vitamin B_{12} supplementation had no measurable effect on mortality, hemoglobin values, body wt., fertility, or egg production of New Hamshire pullets. Absence of supplemental vitamin B_{12} resulted in a marked drop in hatchability. Hatchability of fertile eggs was improved to 49.1%, 57%, and 66.3% when 1.65 μg., 2 μg., and 2.2 μg. of vitamin B_{12} were added per kg. of feed, respectively. Normal hatchability was maintained when 4 μg. of vitamin B_{12} per kg. were fed. The vitamin B_{12} requirement for normal hatchability is considered to be slightly more than 2.2μg. per kg. of ration. Assays of the vitamin B_{12} activity of eggs showed a direct correlation between the vitamin B_{12} content of the maternal diet and the amt. found in the egg. Efficiency of transmission of this vitamin from the diet to the egg appeared to be highest when low levels were fed. According to results of chick assays, eggs from pullets fed the vitamin B_{12}-deficient ration contained approx. 0.6 μg. of vitamin B_{12} activity; whereas, eggs from pullets receiving 16 μg. of supplemental vitamin B_{12} per kg. contained approx. 2.17 μg. Between 83.3% and 90.5% of the vitamin B_{12} activity as detd. by chick assay was not measured by the microbiological assay method employed.—*G. F. Combs.* (Biological Abstracts)

MORIMOTO, H., S. TAKAHASHI, and N. ONISHI.

EFFECT OF IODINE UPON EGG PRODUCTION AND INTERIOR EGG QUALITY. [IN JAPANESE WITH ENGLISH SUMM.] *Bull. Natl. Inst. Agric. Sci.* [*Yahagi, Japan*] *Ser. G. 4:* 145-153. 1952.—Iodine was fed to poultry in an investigation of the possibility of utilizing eggs as an iodine food, and also to study the function of I in the animal body from the standpoint of practical poultry-feeding. The period of trial was 75 days in the low-laying season centering in June. All the exptl. lots showed the lower laying record similarly through the exptl. period, proving that the exptl. feed had no favorable effect on egg production. The I content in the yolk of eggs laid during the test feeding of a seaweed product increased rapidly from about 4th day after the feeding began and remained within the max. range for 8-10 days; in the white, I gradually increased from about 2d day, reached a maximum

range on about 6th day and remained at that level; in the yolk it decreased considerably from about 8th day after the feeding was stopped, and returned to its previous normal content about 10 days later; in the white, it rapidly decreased from the 4th day and returned to its normal content 8-10 days later. When a KI supplement was fed, the course of variation in I content of yolk and white of eggs was about the same as with the seaweed product; when thyroprotein was fed, almost no variation was found in the I content of the eggs through the exptl. period. I content per whole egg was about 0.1 mg. in the preliminary testing period (normal I content); during the period of feeding the seaweed product the figures ranged as high as 4.4 mg.; when KI was fed, total I content per whole egg reached 1.6 mg. at maximum. The avg. I content, even at its maximum, when thyroprotein was fed was no greater than in birds given no I supplement.—*From auth. summ.* (Biological Abstracts)

NOZAKI, H., T. HASHIZUME, S. HORII, K. HIROE, Y. TAKEI, H. MORIMOTO, and Y. KAISHIO.

CALCIUM METABOLISM IN THE LAYING HEN. II. ON THE FATE AND THE RETENTION OF CA IN RELATION TO THE OVULATION. [IN JAPANESE WITH ENGLISH SUMM.] *Bull. Natl. Inst. Agric. Sci.* [*Yahagi, Japan*] *Ser. G. 4:* 137-144. 1952.—10 laying White Leghorn hens were divided into 5 groups, 2 in each, and they were given $Ca^{45}Cl_2$ orally at different stages of egg formation, deduced from previous records, i.e., 5,10,15 hrs. after ovulation and also on the non-ovulation day. The activity of Ca^{45} in the egg, blood, excreta and femur as well as in reproductive organs was estimated 4 hrs. after the treatment. About 40% of the dose taken was demonstrated in the egg-shell of Group III, and in the egg-white Group I showed the max. activity, while in Group I, the egg-yolk had very little activity, other groups having a negligible amt. The activity of the uterus was max. in Group I and V and minimum in Group II. The isthmus showed the max. value in Group V and min. in Group IV. From the albumin secreting portion which showed max. Ca^{45} in Group I, the activity decreased gradually as the process of egg formation advanced. In 1 case where no ovulation occurred, the appearance of Ca^{45} in the blood was more abundant than in other cases where the egg formation was carried on, while in the deposition of Ca^{45} in the largest ovarian follicle and the femur a contrary tendency was ascertained. As the egg formation advanced, the Ca^{45} in the blood or femur tended to decrease gradually. From the amt. of Ca^{45} in the excreta and contents of the digestive canal and kidney, it was considered that the retention of Ca^{45} in the body increased as the egg formation advanced. The retention, however, was lowest when no ovulation occurred.—*From auth. summ.* (Biological Abstracts)

O'NEIL, J. B. (U. Saskatchewan, Saskatoon, Canada.)

FURTHER EVIDENCE OF THE CARRYOVER OF VITAMIN B_{12} IN CHICKS. *Poultry Sci. 31:* 764-768. 1952.—Two pens of New Hampshire hens were fed a diet containing 12% meat meal as a source of animal protein. One pen was supplemented with 0.69 μg. of vitamin B_{12} per 100 g. of total diet for 135 days prior to saving eggs for incubation. At hatching all the chicks were fed a cereal soybean diet for 2 weeks. Those from the supplemented pen gained 12.4% more weight. By 4 weeks the difference was 22.7%, indicating that the carryover was effective for this period. When fed 1 μg. of vitamin B_{12} per 100 g. for 2-4 weeks the % gain in wt. of the chicks from the supplemented pen was no greater than the comparable chicks from the unsupplemented pen. The greater absolute gain in wt. is attributed to the carryover from the breeders' diet. This carryover was evident in the feed efficiency during the 2- to 4-week period. Supplementation of the breeders' diet as mentioned above did not influence production, hatchability or percent size of chick.—*Author.* (Biological Abstracts)

PALAFOX, A. L., and M. M. ROSENBERG. (U. Hawaii, Honolulu.)

FURTHER STUDIES ON THE EFFECT OF DRIED COW MANURE ON THE DOMESTIC FOWL. *Poultry Sci. 31:* 673-678. 1952.—

Hawaii oven- and air-dried cow manures and oven-dried cow manure imported from the U.S.D.A., Beltsville, Md., were biologically assayed for androgenic potency. These manures were also fed to laying hens. Local oven- and air-dried manures collected urine-free from lactating cows contained little, if any, androgenic potency when detd. by comb growth of chicks. Although the imported manure induced a somewhat greater comb growth, the stimulation was significantly less for females, but not for males, when compared with the comb growth induced by 5 mg. of crystalline testosterone hydrochloride per kg. of feed. 15% local and U.S.D.A. oven-dried manures exhibited no significant effect on production, body wt., feed consumption, and hatchability when these rations were corrected for protein by adding sufficient herring meal to insure a minimum of 16% protein in each diet. Oven-dried cow manure of low androgenic potency was fed successfully to laying hens at 15% of total ration.—*Authors.* (Biological Abstracts)

PATRICK, H., and G. K. SCHWEITZER. (U. Tennessee, Knoxville.)
THE INFLUENCE OF CERTAIN WATER SOLUBLE VITAMINS ON PHOSPHORUS (P^{32}) IN BONE MINERALIZATION. *Poultry Sci. 31:* 750-751. 1952.—P^{32} can be used in studies dealing with bone mineralization. When chicks are fed a simplified ration containing controlled amts. of Ca, P and the water soluble vits., it is possible to demonstrate a relationship between P and any one of the following water-soluble vits.: riboflavin, pantothenic acid, p-amino benzoic acid, pyridoxine, folic acid and niacin.—*Homer Patrick.* (Biological Abstracts)

PATRICK, H., and G. K. SCHWEITZER. (U. Tennessee, Knoxville.)
ABSORPTION AND RETENTION OF RADIOACTIVE PHOSPHORUS BY CHICKS. *Poultry Sci. 31:* 888-929. 1952.—Vit. D increases the absorption of P from the digestive system as detd. by the P^{32} content of the tibia and feces. Chicks which receive adequate amts. of P placed a larger percentage of supplementary P^{32} in the bones than the chicks which received inadequate amts. of the mineral. The water-soluble vits: niacin, Ca pantothenate, p-amino benzoic acid, pyridoxine, vit. B_{12} and folic acid increased the amt. of P deposited in the bones.—*H. Patrick.* (Biological Abstracts)

PETERSON, D. W., C. R. GRAU, and N. F. PEEK. (U. California, Berkeley.)
GROWTH AND FOOD UTILIZATION WITH DIETS OF VARYING PROTEIN AND CELLULOSE LEVELS. *Poultry Sci. 31:* 931. 1952.—*An abstract.* (Biological Abstracts)

RAMSAY, W. N. M. (U. Edinburgh.)
IRON METABOLISM AND HAEMOGLOBIN FORMATION IN THE EMBRYONATED HEN EGG. 3. IRON IN THE LIVER AND BLOOD OF THE HATCHING CHICK. *Biochem. Jour. 51:* 289-291. 1952.—Total blood Fe in 13 newly-hatched chicks was 35.5 mg./100 ml. (S.D. 2.0). The livers of 21 newly-hatched chicks contained only 45.4 μg. total Fe (S.D. 12.5) and 22.7 μg. non-heme Fe (S.D. 5.9). Apparently the liver of the newly-hatched chick contains no appreciable store of Fe.—*Auth summ.* (Biological Abstracts)

ROSENBERG, M. M. (U. Hawaii, Honolulu.)
LOW GRADE SUGAR, A POTENTIAL CARBOHYDRATE FEEDSTUFF FOR LAYING CHICKENS. *Poultry Sci. 31:* 933. 1952.—*An abstract.* (Biological Abstracts)

ROSENBERG, M. M., W. MORIKAWA, and O. A. BUSHNELL. (U. Hawaii, Honolulu.)
THE EFFECT OF INCREASING CONCENTRATIONS OF TERRAMYCIN ON THE GROWTH AND INTESTINAL MICROFLORA OF CHICKS. *Poultry Sci. 31:* 708-714. 1952.—Terramycin, introduced into the diet in the form of Bi-Con TM-5, was fed at 5 progressively doubled concns., in 2 trials, to determine its effect on the intestinal microflora of chicks. Counts of organisms present in natural

feces were made, using the following media: thioglycollate broth, tryptose-glucose-yeast extract agar, carrot-liver agar, S-F broth, Difco's modification of eosin-methylene blue agar, and potato-glucose agar. Although terramycin significantly stimulated the growth rate of chicks during the two 28-day studies and increased the efficiency of feed utilization, the microflora detectable by the techniques used was not eliminated or even significantly reduced in number, even when 16 times the recommended amount of terramycin was fed. In both trials the enterococci counts were significantly greater among the groups receiving the higher concns. of terramycin.—*Authors.* (Biological Abstracts)

SCOTT, H. M., B. C. JOHNSON, and E. A. GOFFI. (Illinois Agric. Expt. Sta., Urbana)

EFFECT OF SURFACE ACTIVE AGENTS ON CHICK GROWTH. *Poultry Sci. 31:* 746-747. 1952.—Six surface active agents (SAA) differing widely with respect to their emulsifying, dispersing, and wetting action were tested for their growth-promoting ability when added to an all-plant (corn-soya) ration at a level of 0.1%. The test ration contained added B_{12}, riboflavin, pantothenic acid, choline and niacin. While none of the SAA stimulated chick growth to 28 days, aureomycin (50 mg./kg. ration) gave a positive response of 17%.—*H. M. Scott.* (Biological Abstracts)

SCOTT, M L., and G. F. HEUSER. (Cornell U., Ithaca, N. Y.)

STUDIES IN DUCK NUTRITION. 4. BOWED LEGS IN DUCKS CAUSED BY NIACIN DEFICIENCY. *Poultry Sci. 31:* 752-754. 1952.—Pekin ducklings kept on wire-mesh floors and fed practical rations developed a severe bowing of the legs which was shown to be due to a niacin deficiency. This deficiency was entirely prevented by including 7.5% of dried brewer's yeast in the ration or by the addition of 10 mg. of synthetic niacin per lb. of ration.—*G. F. Heuser.* (Biological Abstracts)

SCOTT, H. M., E. A. GOFFI, and W. A. GLISTA. (Illinois Agric. Expt. Sta., Urbana.)

THE PROTEIN REQUIREMENT OF THE CHICK AS INFLUENCED BY AUREOMYCIN. *Poultry Sci. 31:* 751-752. 1952.—Diets containing 20, 17 and 14% protein (N x 6.25) were fed with aureomycin (15 mg./kg. diet) and without antibiotic to groups of 20 crossbred male chicks for 28 days. Cerelose (dextrose) was used in the basal diet as the source of carbohydrate and the level of protein was varied by adjustments in soybean meal and DL-methionine. The antibiotic had no effect on growth with the 20% protein diet but gains were improved when the lower protein diets were supplemented with aureomycin. The antibiotic appeared to stimulate feed consumption. However, at the 17% level of protein the avg. relative improvement (antibiotic over basal) in gross efficiency of feed utilization was of the same magnitude as the gross efficiency of protein utilization. This was also true for the 14% diets. Since the improvement in protein efficiency was no better than the improvement in over-all feed utilization it was concluded that aureomycin had not spared protein per se. In all cases growth and feed conversion were adversely affected by lowering the protein level.—*H. M. Scott.* (Biological Abstracts)

SIEBURTH, JANICE F., JAMES McGINNIS, TOM WAHL, and BARBARA A. McLAREN. (State Coll. Washington, Pullman.)

THE AVAILABILITY OF THE PHOSPHORUS IN UNIFINE FLOUR FOR THE CHICK. *Poultry Sci. 31:* 813-818. 1952.—The P from Unifine flour was shown to be almost completely available for growth and somewhat less available for bone deposition in the chick. For optimum bone ash 0.3% wheat P and 0.4% inorganic P as supplied by dicalcium phosphate was required. There seemed to be a higher P requirement for optimum bone ash than for opt. growth. The best growth in this expt. was obtained with 0.3% inorganic and 0.2% organic P. There appeared to be no difference in availability of the organic P due to the decreased particle size in the Unifine flour as compared with

cracked wheat. However, addition of the whole-wheat flour increased growth and bone deposition over and above that which could be accounted for by P alone. These results suggest that wheat contains an unrecognized factor required by the chick. The P from Ca phytate and aluminum phosphate were relatively unavailable for growth although that in Ca phytate seemed to be utilized for bone deposition at the level used. Addition of aluminum chloride to a diet containing Unifine flour seemed to somewhat reduce the availability of P for growth and significantly reduced the tibia ash.—*J. McGinnis.* (Biological Abstracts)

SIEBURTH, JOHN McNEILL, JOEL R. STERN, and JAMES McGINNIS. (State Coll. Washington, Pullman.)
THE EFFECT OF ANTIBIOTICS AND FECAL PREPARATIONS ON GROWTH OF TURKEY POULTS. *Poultry Sci. 31:* 625-627. 1952.—Allowing poults access to feces spread on paper during the 1st week only did not have a growth-depressing action at 4 weeks under the conditions of the expt. Feeding a diet containing a culture of turkey feces tended to depress growth. Autoclaving the culture or adding 5 ppm. of procaine penicillin overcame the growth-retarding effect. Restricting the feed intake of poults receiving penicillin to that of poults fed the basal diet did not eliminate the growth-promoting effect of this antibiotic. This indicates that penicillin does not promote growth simply by increasing feed consumption.—*J. R. Stern.* (Biological Abstracts)

SINGSEN, E. P., L. D. MATTERSON, and ANNA KOZEFF. (Connecticut Agric. Expt. Sta., Storrs.)
A HIGH-EFFICIENCY RATION FOR LAYING AND BREEDING HENS. *Bull. Storrs Agric. Expt. Sta. 286.* 3-11. 1952. (Biological Abstracts)

SIZEMORE, J. R., R. J. LILLIE, and H. R. BIRD. (Agric. Res. Admn., Beltsville, Md.)
INFLUENCE OF AUREOMYCIN IN THE CHICK DIET UPON SUBSEQUENT REPRODUCTIVE PERFORMANCE OF LAYING HENS. *Poultry Sci. 31:* 935-936. 1952.—*An abstract.* (Biological Abstracts)

SLINGER, S. J., J. E. BERGEY, W. F. PEPPER, E. S. SNYDER, and D. ARTHUR. (Ontario Agric. Coll., Guelph, Canada.)
EFFECT OF ANTIBIOTICS ON THE PROTEIN REQUIREMENT OF BROILERS. *Poultry Sci. 31:* 757-764. 1952.—Two expts. were made to determine the influence of antibiotics on the protein requirements of heavy-breed male broilers. Protein levels of 17, 20, 23 and 26% were employed in each expt. The effects of protein level and antibiotic (penicillin or aureomycin) were highly significant. Interactions between the level of protein and antibiotic did not prove to be significant in either expt. Evidence is presented to indicate that antibiotics enhanced the utilization of both protein and energy compounds. This may explain why the antibiotics failed to reduce the requirement for either protein or energy. The protein requirement for maximum growth and feed efficiency to 10 weeks of age was in excess of 20%. On the other hand, levels of protein which resulted in maximum growth and feed efficiency were too high for the production of broilers of optimum market quality. It is suggested that heavy-breed male broilers be fed diets containing in excess of 20% protein during the growing period and that the level be reduced to 20% or less for a finishing period of a few weeks.—*S. J. Slinger.* (Biological Abstracts)

SLINGER, S. J., A. M. MORPHET, K. M. GARTLEY, and D. ARTHUR. (Ontario Agric. Coll., Guelph, Canada.)
EFFECT OF PENICILLIN ON THE GROWTH OF TURKEYS FED DIETS OF VARYING PROTEIN CONTENT. *Poultry Sci. 31:* 881-887. 1952.—Broad Breasted Bronze poults were fed diets for the first 8 weeks based on wheat and either 50 or 44% protein soybean oil meal. The protein level was varied with each of these meals from about 26 to 34% and all diets were fed both in the presence and absence of 10 ppm.

of procaine penicillin G. For the 8 to 24-week period, groups which had received similar levels of protein, but from different soybean oil meals, were combined. Groups which had been fed penicillin in the starting period continued to receive it during the growing period. During the growing period all birds were fed a 20% protein mash, based on wheat and soybean oil meal, along with whole wheat. Mash and wheat were fed ad libitum. The effects of penicillin and sex upon wt. were significant at 8 weeks of age. The effects of protein level, protein type x protein level, protein type x penicillin and penicillin x protein level were not significant. In spite of a lack of statistical support the data suggest that a level of 26% protein was too low in the absence of antibiotic. It would also appear that, in the presence of penicillin, a level of 26% protein was adequate when 44% protein-soybean oil meal was the supplement but that the protein requirement was in excess of 26% protein when 50% protein-soybean oil meal was used. Again, while not supported statistically, the penicillin response appeared to be somewhat less with diets containing about 29% protein than with lower or higher levels. The effect of penicillin was still apparent at 24 weeks of age but was less than at 8 weeks. There appeared to be little influence of the protein level in the starting diet on the wt. at 24 weeks in the case of groups not fed penicillin. For groups receiving penicillin, however, the wt. at 24 weeks of age tended to improve as the protein content of the starting diet was increased from 26 to 34%. Based on the results at 24 weeks of age it would appear that a level of 26% protein in the starting diet was adequate in the absence of penicillin but that a somewhat higher level was effective when the birds received the antibiotic. Turkeys were raised successfully from hatching to market wt. with diets in which wheat was the only cereal grain and soybean oil meal the sole protein supplement.—*S. J. Slinger.* (Biological Abstracts)

SLINGER, S. J., W. F. PEPPER, and D. C. HILL. (Ontario Agric. Coll., Guelph, Ont., Canada.)
METHIONINE SUPPLEMENTATION OF BROILER DIETS HIGH IN WHEAT. *Poultry Sci. 31:* 936. 1952.—*An abstract.* (Biological Abstracts)

SLINGER, S. J., E. S. SNYDER, W. F. PEPPER, and G. W. ANDERSON. (Ontario Agric. Coll., Guelph, Ont., Canada.)
EFFECT OF PENICILLIN ON THE GROWTH OF GOSLINGS. *Poultry Sci. 31:* 941. 1952.—*An abstract.* (Biological Abstracts)

SLINGER, S. J., W. F. PEPPER, and D. C. HILL. (Ontario Agric. Coll., Guelph, Canada.)
EFFECT OF PENICILLIN ON THE TOLERANCE OF TURKEYS TO FAT. *Arch. Biochem. and Biophys. 37:* 266-269. 1952.—The growth depressive effect of a high level of corn oil was largely overcome by penicillin. This suggests that the antibiotic increases the tolerance of turkey poults to fat. (Biological Abstracts)

SMITH, S B., J. P. DELAPLANE, and W. H. WILEY. (Rhode Island Agric. Expt. Sta., Kingston.)
THE EFFECT ON PRODUCTION AND HATCHABILITY OF FEEDING LAYING PULLETS SULFAQUINOXALINE AT THE 0.033 PERCENT LEVEL. *Poultry Sci. 31:* 679-680. 1952.—The effect on production and hatchability of feeding laying pullets sulfaquinoxaline at the 0.033% level continuously in mash was studied by comparing 2 pens of 110 R. I. Red pullets mated with 12 cockerels of the same breed. It is concluded that sulfaquinoxaline can be fed at the 0.033% level in mash continuously without significantly affecting production, fertility, or hatchability in laying hens.—*S. B. Smith.* (Biological Abstracts)

SQUIBB, ROBERT L., and MIRIAM K. WYLD. (Inst. Nac. Agropecuario, Guatemala.)
EFFECT OF YUCA MEAL IN BABY CHICK RATIONS. *Turrialbae 1(6):* 298-299. 1951.—Yuca meal [Sassava meal, *Manihot utilissima*] replaced corn in rations containing several sources of proteins and

dried forage meals. In 3 out of 7 expts., chicks fed yuca meal showed significantly poorer growth than those fed corn; in the remaining expts. there were no significant differences in growth rates. It is important to prepare yuca meal free of contaminants. Under Guatemala conditions, yuca meal may satisfactorily replace corn in baby chick rations.—*From auth. summ.* (Biological Abstracts)

STEPHENSON, E. L., and B. B. CLOWER. (U. Arkansas, Fayetteville.)
THE INFLUENCE OF AN UNIDENTIFIED FACTOR IN FISH SOLUBLES ON HATCHABILITY. *Poultry Sci. 31:* 936-937. 1952.—*An abstract.* (Biological Abstracts)

STOKSTAD, E. L. R., R. G. ESPOSITO, J. E. GRADY, and WILLIAM L. WILLIAMS. (Amer. Cyanamid Co., Pearl River, N. Y.)
STABILITY OF ANTIBIOTICS IN POULTRY FEEDS DURING PELLETING AND STORAGE. *Poultry Sci. 31:* 937. 1952.—*An abstract.* (Biological Abstracts)

SUNDE, M. L., J. R. VEDVIK, H. W. BRUINS, and W. W. CRAVENS. (U. Wisconsin, Madison.)
EFFECT ON GROWTH OF SUPPLEMENTS TO CHICK RATIONS CONTAINING VITAMIN B_{12} AND ANTIBIOTICS. *Poultry Sci. 31:* 571-576. 1952.—Expts. to determine the effect of additions of various supplements to all-vegetable type rations fortified with vitamin B_{12} and antibiotic have been conducted. The chicks were maintained in batteries or on floor pens. Fish solubles, torula yeast, meat scraps, and condensed homogenized fish contain a factor which stimulates the growth of chicks fed an all-vegetable ration containing vitamin B_{12} and antibiotic. This growth response was obtained with chicks reared in batteries or on litter, irrespective of the feeding and management procedure employed with the dams. DL-methionine, in combination with niacin and Ca pantothenate also improved the rate of growth of the chicks, but addition of either fish solubles or torula yeast resulted in further stimulation of growth, especially during the early growth period. A combination of methionine and torula yeast was more effective than either alone.—*M. L. Sunde.* (Biological Abstracts)

SUNDE, M. L., J. G. HALPIN, and W. W. CRAVENS. (U. Wisconsin, Madison.)
THE EFFECT OF VITAMIN B_{12} SUPPLEMENTS AND ANTIBIOTIC FEED SUPPLEMENTS ON EGG PRODUCTION AND HATCHABILITY. *Poultry Sci. 31:* 617-620. 1952.—Two long-term expts. were conducted to determine the effect of vitamin B_{12} and/or antibiotic feed supplement on laying and breeding hens maintained on built up litter. Addition of vitamin B_{12} and/or antibiotic to the basal ration did not improve egg production. Hatchability was improved by the addition of vitamin B_{12} supplements to the basal ration when the birds were maintained on litter being used a 2d yr. Addition of an antibiotic supplement to a ration containing vitamin B_{12} did not result in improved hatchability. Hens which were fed an all vegetable type ration maintained excellent hatchability when kept on deep litter which had been in continuous use for 3 yrs.—*M. L. Sunde.* (Biological Abstracts)

WAIBEL, P. E., M. L. SUNDE, and W. W. CRAVENS. (U. Wisconsin, Madison.)
EFFECT OF ADDITION OF PENICILLIN TO THE HEN'S RATION ON BIOTIN AND FOLIC ACID CONTENT OF EGGS. *Poultry Sci. 31:* 621-624. 1952.—Addition of 200 mg. of procaine penicillin G per kg. of a practical breeder diet resulted in no measurable effect on egg production, body wt., or hatchability of eggs for an exptl. period of 10 months. In expt. 1, addition of 200 mg. of procaine penicillin G per kg. of diet increased biotin and folic acid deposition in the egg yolk 41.1 and 12.6%, respectively, for the exptl. period. In expt. 2, addition of 5 and 200 mg. of penicillin per kg. of ration resulted in 29.6 and 38.5% increases in biotin deposition, and 31% and 26.7% increases in folic acid deposition, respectively.—*P. E. Waibel.* (Biological Abstracts)

WHITE-STEVENS, R. H., W. M. HENDRIXSON, and R. S. INGRAM. (Kentucky Chem. Indust., Inc., Cincinnati, Ohio.)
STUDIES ON THE INTER-RELATION OF ANTIBIOTIC FEED SUPPLEMENTS AND COCCIDIOSTATIC DRUGS IN THE PRODUCTION OF BROILER CHICKENS ON THE DELMARVA PENINSULA. *Poultry Sci. 31:* 939. 1952.—*An abstract.* (Biological Abstracts)

WIESE, A. C., C. F. PETERSEN, R. V. DAHLSTROM, and C. E. LAMPMAN. (U. Idaho, Moscow.)
EFFECT OF VITAMIN B_{12} INTAKE OF HENS UPON CARRY-OVER IN CHICKS. *Poultry Sci. 31:* 851-854. 1952.—Six lots of 16 White Leghorn hens each were fed an all-plant diet deficient in vit. B_{12} until hatchability of fertile eggs was reduced to a low level. One group was then continued on the basal diet, a 2d group's diet was supplemented with 3% fish meal, and the hens in the other 4 groups were injd. weekly for 8 weeks with levels of 0.5, 1, 2, or 4 μg. of vit. B_{12}. The chicks obtained from the 2d, 4th, 6th, and 8th week of this treatment were fed either a vit. B_{12}-deficient diet or one containing adequate B_{12} to measure the carry-over of the vit. from the dams to the newly-hatched chicks. A minimum level sufficient to support excellent hatchability did not transfer adequate amts. to assure normal chick growth or viability when chicks were fed an inadequate diet. A level of 3% fish meal in the breeder diet, or weekly injns. of 4 μg. of B_{12} per hen, resulted in the transfer of adequate levels of the vit. to assure maximum carry-over as measured by chick growth to 4 weeks of age. Injns. of 4 μg. of B_{12} per week would be approx. equivalent to 6 μg. of B_{12} per kg. of diet.—*C. F. Petersen.* (Biological Abstracts)

WILLIAMS, O. M., and J. E. HILL. (Mississippi Agric. Expt. Sta., State College.)
THE EFFECT OF ANTIBIOTICS ON THE GROWTH OF TWO VARIETIES OF TURKEY POULTS. *Poultry Sci. 31:* 769-772. 1952.—Aureomycin, streptomycin, and penicillin at the rates of 10 g., 10 g., and 2 g. per ton of feed, respectively, were fed singly and in combination at one level only, to Beltsville White and Broad Breasted Bronze poults. There was no significant difference, with either variety of poults, between the following treatments; aureomycin alone vs. the triple combination, penicillin vs. the triple combination, or aureomycin plus penicillin vs. the triple combination. With the White poults, the combination of aureomycin plus penicillin was significantly better than any antibiotic fed singly. With the Bronze poults, aureomycin plus penicillin was highly significantly better than penicillin alone but was no better than aureomycin alone. There was no significant difference when aureomycin alone was compared with penicillin alone, with the White poults, but aureomycin was significantly better than penicillin with the Bronze poults. Streptomycin was highly significantly better than the control pen with the White poults. With the Bronze, there was no difference between the control pen and the pen receiving streptomycin. There seemed to be a variety difference in the response to these antibiotics when fed at the same level.—*O. M. Williams.* (Biological Abstracts)

WILSON, WILBOR O., and WILLIAM H. EDWARDS. (U. California, Davis.)
RESPONSE OF HENS UNDER THERMAL STRESS TO DEHYDRATION AND CHILLED DRINKING WATER. *Amer. Jour. Physiol. 169(1):* 102-107. 1952.—When the room temp. was held at 90°F., the following observations were made on laying Leghorn hens: Withholding water drastically limited feed consumption. The hen conserved her supply of body water by reducing her respiration rate and voiding drier droppings. When water was withheld for 25 hrs., only a short interruption of egg production was observed; when water was withheld for 48 hrs. egg production ceased and some of the pullets molted, but later came back into production; the same was true for the 72-hr. period. Cooling the drinking water lowered body temp.; otherwise the birds responded practically the same as did the controls given warm water to drink.—*W. O. Wilson.* (Biological Abstracts)

WOLBACH, S. BURT. (The Children's Hosp., Boston), **and D. MARK HEGSTED.** (Harvard Med. Sch., Boston).
HYPER-VITAMINOSIS A AND THE SKELETON OF GROWING CHICKS. *Arch. Pathol. 54(1):* 30-38. 1952.—Excessive vit. A admd. to young chicks results in an acceleration of all sequences concerned in endochondral bone growth. The vascular penetration of the epiphyseal cartilage is accelerated with the result that the zone of maturing cartilage cells is markedly reduced and that the tunnelling extends much deeper into the cartilage. There is likewise an acceleration of bone deposition on the cartilage and more rapid compact bone formation so that all bones become much denser than in normal controls.—*S. B. Wolbach.* (Biological Abstracts)

WOLBACH, S. BURT. (The Children's Hosp., Boston), **and D. MARK HEGSTED.** (Harvard Med. Sch., Boston.)
VITAMIN A DEFICIENCY IN THE CHICK. SKELETAL GROWTH AND THE CENTRAL NERVOUS SYSTEM. *Arch. Pathol. 54(1):* 13-29. 1952.—Vit. A deficiency in young chicks results in prompt suppression of endochondral bone growth while growth of soft tissues, including the central nervous system, continues. The result is a disproportionate growth of the central nervous system and bony investures. The neurological manifestations of vit. A deficiency of the chick are the result of compression of the central nervous system and that, as in mammals, vit. A is not an essential for the growth of the central nervous system.—*S. B. Wolbach.* (Biological Abstracts)

ANONYMOUS.
CHICKENS CAN BUILD OWN PROTEINS. *Amer. Egg and Poultry Rev. 14(5):* 52. 1952.—A report given at the American Institute of Nutrition by workers in the U.S.D.A. describes the addition of (S^{35}) to feed to hens in the form of dilute H_2SO_4. Protein from eggs produced by these hens, when checked with a Geiger-Mueller counter, showed the presence of the radioactive sulfur. Purification of the proteins showed the S^{35} to be present in cystine, but not present in methionine. Thus chickens may use inorganic sulfate to make cystine.—*H. G. Lindquist.* (Biological Abstracts)

ANONYMOUS.
SCIENTISTS DISCUSS ANTIBIOTIC RESEARCH WITH GERM-FREE CHICKS AND TURKEY POULTS. *Feedstuffs 24(25):* 10,11,14,58,62,63. 1952.—Dr. T. D. Luckey reported that germ-free chicks and poults showed no growth response when sulfasuxidine, streptomycin, bacitracin, or chloramphenicol were added at the rate of 50 mg./kg. of diet before autoclaving. The results with procaine penicillin and terramycin were variable, but indicated a negative growth response. Germ-free chickens generally grow somewhat faster than conventional birds but Dr. H. A. Gordon reported that the general health, growth, and R. B. C. are about the same as those for conventional chicks and that they reach sexual maturity at about the same time. The small intestine and ceca weight 33-50% less. The germ-free birds are very similar to the procaine penicillin-fed conventionally-reared birds. There is also a stimulation of the thymus in both of these classes of birds.—*H. L. Wilcke.* (Biological Abstracts)

PATHOLOGY

BOTTS, C. W., L. C. FERGUSON, J. M. BIRKELAND, and A. R. WINTER.
THE INFLUENCE OF LITTER ON THE CONTROL OF SALMONELLA INFECTIONS IN CHICKS. *Amer. Jour. Vet. Res. 13(49):* 562-565. 1952.—Day-old chicks were placed on new and on built-up litter and exposed orally to *S. pullorum.* Mortality was 80% in one trial and 83% in a 2d with no differences in the types of litter. In each of the 2 trials, the surviving chicks were removed from the pens and other day-

old chicks were placed in the naturally contaminated pens. Mortality was only 1% with no deaths ascribed to pullorum disease during a period of 45 days. Bacteriologic examination of the litters at intervals during the trials indicated that *S. pullorum* disappeared from built-up litter in 15 to 21 days, but persisted in new cob litter for 48-70 days. Chickens 6 weeks of age were placed on litter which had just been sprayed with *S. gallinarum:* 16 of 30 chickens on contaminated new cob litter died, while only 10 of 30 on built-up litter died.—*Authors.* (Biological Abstracts)

LEVADIE, B. T. H., JAMES McGINNIS, and J. S. CARVER. (State Coll., Washington, Pullman.)
THE EFFECT OF DIETHYLSTILBESTROL ON MORTALITY CAUSED BY VISCERAL GOUT IN CHICKS. *Arch. Biochem. and Biophys. 40(1):* 68-70. 1952.—Treatment of chicks with diethylstilbestrol greatly reduced mortality from diet-induced visceral gout. This effect was particularly pronounced with male chicks.—*Auth. summ.* (Biological Abstracts)

PETERSON, E. H. (Charles Pfizer and Co., Brooklyn, N. Y.)
TERRAMYCIN REDUCES EARLY POULT MORTALITY. *Poultry Sci. 31:* 898-899. 1952. (Biological Abstracts)

SEEGER, KARL C., and ERNEST F. WALLER. (U. Delaware, Newark.)
CAUSES OF MORTALITY IN BROILERS. *Poultry Sci. 31:* 934-935. 1952.—*An abstract.* (Biological Abstracts)

POULTRY PRODUCTS AND MARKETING

BAUM, E. L., H. G. WALKUP, W. J. STADELMAN, and J. E. FARIS. (State Coll., Washington, Pullman.)
SOME ECONOMIC IMPLICATIONS OF THIOURACIL AND DIETHYLSTILBESTROL TREATMENT OF TURKEYS. *Poultry Sci. 31:* 723-729. 1952.—The use of thiouracil and diethylstilbestrol permits the marketing of turkeys at a much earlier date (lower wt.) than non-treated turkeys. Physical feed input-output relationships for non-treated Broad Breasted Bronze turkeys are similar to those for Broad Breasted Bronze turkey roasters treated with 0.2% thiouracil and 24 mg. diethylstilbestrol. Non-treated turkeys at 26 weeks of age grade out similar to treated turkey roasters at 21 weeks of age. Under the present conditions of turkey production, taking into account the costs of feed and prices for the product, it appears that thiouracil-diethylstilbestrol treatment of tom turkeys to encourage earlier finishing is warranted where the grower has profitable alternatives for his labor and/or when the risk element involving mortality is expected to be high. The treatment of hen turkeys to encourage earlier finishing, however, does not seem advisable from a profit-making viewpoint. The above conclusions concerning both toms and hens may not be valid, however, if knowledge that treated turkeys have higher quality attributes, e.g., tenderness and flavor, becomes general public knowledge and a means of positive identification of carcasses of treated turkeys is utilized. In such a case, premiums for these birds might warrant treatment at all possible marketing wts. for both toms and hens.—*Authors.* (Biological Abstracts)

BLOW, W. L., and E. W. GLAZENER. (North Carolina Agric. Expt. Sta., Raleigh.)
THE APPRAISAL OF CONFORMATION IN BROILERS. *Poultry Sci. 31:* 654-658. 1952.—Several criteria of conformation were used with 100 broiler New Hampshires to appraise the yield of breast meat in broilers. These criteria included breast width, breast angle, cross-sectional breast area, the Bird index, handling quality, and body wt. Body wt. appeared to be the superior single observation for evaluating

the amount of breast fleshing. Breast width, because of the ease of measuring, was recommended for use in conjunction with body weight for selecting individuals with superior fleshing qualities.—*Authors.* (Biological Abstracts)

CARD, L. E., and H. M. SCOTT. (U. Illinois, Urbana.)
MAXIMIZING RETURNS IN BROILER GROWING. *Poultry Sci. 31:* 910. 1952.—*An abstract.* (Biological Abstracts)

CSONKA, FRANK A., and MERRIAM A. JONES. (U. S. Dept. Agric., Washington, D. C.)
FACTORS AFFECTING THE PERCENTAGE OF CERTAIN PROTEINS IN EGG WHITE. *Jour. Nutrition 46:* 531-537. 1952.—Feeding expts. were conducted to determine the influence of diet and of the genetic lineage of the hen on the protein composition of egg white. The major differences, as detd. electrophoretically, were in the ovomucoid, globulin, and conalbumin content of the eggs. The factors contributing to these differences were the proteins in the hens' diet as well as the genetical lineage of the hens.—*Auth.* (courtesy Wistar Bibl. Serv.).

DAVIS, JOHN GORTON, HELEN L. HANSON, and HANS LINEWEAVER. (West. Reg. Res. Lab., Albany, Cal.)
CHARACTERIZATION OF THE EFFECT OF FREEZING ON COOKED EGG WHITE. *Food Res. 17:* 393-401. 1952.—The mechanical effects of ice crystal formation, as distinguished from protein dehydration effects, are the principal causes of damage to cooked egg white on freezing. This is demonstrated by the improved structure of samples which supercooled before freezing or to which a finely dispersed solid, such as calcium carbonate, had been added to effect the formation of small ice crystals. Various soluble additives had little or no effect in improving the structure of frozen cooked white. The separation of liquid from the frozen cooked white is influenced by ice crystal size and by the strength of the egg white submitted to freezing. The gel strength is influenced strongly by pH. In contrast to plain egg white, cooked mixtures of yolk and white are more stable to freezing.—*J. G. Davis.* (Biological Abstracts)

EVANS, ROBERT JOHN, J. A. DAVIDSON, and HELEN A. BUTTS. (Michigan State Coll., East Lansing.)
THE PANTOTHENIC ACID CONTENT OF FRESH AND STORED SHELL EGGS. *Poultry Sci. 31:* 777-780. 1952.—Eggs were obtained from 8 hens that were kept in laying cages and fed a diet of constant composition. Three eggs from each hen were used for each pantothenic acid assay. Eggs were assayed fresh and after 3, 6, and 12 months of storage at 0°C. Fresh eggs contained on the avg. 608 μg. of panthothenic acid per egg or 12.5 μg. per g. The highest concn. of pantothenic acid was in the yolk which contained 30.6 μg./g. compared to 3.0 μg./g. in the albumen. The avg. amt. of pantothenic acid per yolk of one egg was 511 μg. and per albumen was 97.7 μg. An avg. loss of 49 μg. (8%) of pantothenic acid per egg occurred during 12 months of cold storage. There was also a transfer of pantothenic acid from the yolk to the albumen. Twelve-months-old eggs had on the avg. 347 μg. (17.8 μg./g.) of pantothenic acid in the yolk and 213 μg. (7.8 μg./g.) in the albumen. —*R. J. Evans.* (Biological Abstracts)

FEENEY, R. E., E. D. DUCAY, R. B. SILVA, and L. R. MacDONNELL. (West. Reg. Res. Lab., Albany, Calif.)
CHEMISTRY OF SHELL EGG DETERIORATION: THE EGG WHITE PROTEINS. *(Poultry Sci. 31:* 639-650. 1952.—The proteins of fresh (thick and thin) and deteriorated (thinned) egg white were studied to obtain information as to the causes and mechanisms of thinning of egg white during the storage of eggs. Specific biochemical or chemical assays and analyses were made for the following egg white proteins: lysozyme, conalbumin, ovomucoid, avidin, and the virus antihemagglutinin activity. Tryptophan and sulfhydryl detns. were also made. Approx. 4 times the concn. of the antihemagglutinin activity was

found in the thick white as in the thin white. A high degree of stability of the egg white proteins was found during storage of intact shell eggs and of whites aseptically separated from fresh eggs and stored in the separated condition. After 45 days at 35°C. no significant decreases were found with the exception of lysozyme activity, which showed a 20-30% decrease. The significance of this decrease as well as other results in an interpretation of the causes of the thinning of egg white are discussed. —*R. E. Feeney.* (Biological Abstracts)

GERICKE, A. M. M.
THE PRODUCTION AND MARKETING OF EGGS. *South Africa Dept. Agric. Bull. 307.* 1-36. 1951.—This bulletin deals with the structure of the egg and the various factors influencing its quality. The grades of eggs, packing, storage, preservation and seasonal distribution are given.—*A. M. Gericke.* (Biological Abstracts)

GWIN, J. M. (U. Maryland, College Park.)
A REPORT OF QUALITY CHANGES OCCURRING IN SHELL EGGS DURING CARLOT SHIPMENTS. *Amer. Egg and Poultry Rev. 14(5):* 8, 10, 69. 1952.—This study was made during 1941-1945 on 5000 lots of about 600 cases each of eggs purchased by the U. S. Army. About 15% of Grade A or better eggs dropped to a Grade B and only about 1% of Grade B dropped to Grade C and practically none of Grade C were below the standard for that grade, from the time of inspection at point of origin and point of destination. Loss due to broken eggs, rots, "bloods" and similar defects was almost negligible.—*H. G. Lindquist.* (Biological Abstracts)

GWIN, JAMES M. (U. Maryland, College Park.)
THE QUALITY LOSS IN SHELL EGGS RESULTING FROM TIME IN TRANSIT. *Amer. Egg and Poultry Review. 14(6):* 4-6, 39. 1952. (Biological Abstracts)

GWIN, JAMES M. (U. Maryland, College Park.)
QUALITY LOSS IN SHELL EGGS FROM THE DISTANCE TRAVELED AND SEASONAL INFLUENCE. *Amer. Egg and Poultry Rev. 14(7):* 10, 12, 14, 15. 1952. (Biological Abstracts)

HOFFERT, E., A. R. PLAGGE, B. LOWE, and G. F. STEWART. (Iowa State Coll., Ames.)
THE DEFROSTING METHOD AND PALATABILITY OF POULTRY. *Food and Technol. 6(9):* 337-338. 1952.—Roasters were divided into halves by sawing through the back and keel bones. Halves were defrosted in the oven, refrigerator, room, and in water. Defrosting and cooking times and weight changes varied significantly among methods of defrosting. No significant differences in palatability between treatments were noted.—*Authors.* (Biological Abstracts)

JENSEN, L. S., and W. J. STADELMAN. (State Coll., Washington, Pullman.)
A STUDY OF EGG QUALITY IN MARKET CHANNELS. *Poultry Sci. 31:* 772-776. 1952.—The quality of over 16,000 eggs was traced from the farm through market channels in Seattle to the retail stores. Eggs were handled through 3 different market agencies. The results clearly show that refrigeration at the assembly points and a shortened marketing period are 2 of the principal means by which the quality of eggs received by the consumer can be assured.—*W. J. Stadelman.* (Biological Abstracts)

JOHNDREW, O. F. JR., and W. E. HAUVER, JR.
POULTRY GRADING MANUAL. *U. S. Dept. Agric. Handbook 31:* 1-65. 1952.—Defines the various classes of poultry; discusses the various factors taken into consideration in grading live, dressed, and ready-to-cook poultry; describes official grading and inspection programs; mentions Federal and State and Municipal laws affecting the grading and marketing of poultry; tells how to plan a poultry grading school. (Biological Abstracts)

JUDGE, GEORGE G., and RALPH L. BAKER. (Iowa State Coll., Ames.)
TIME AND COST FUNCTIONS FOR EGG ROUTES. *Poultry Sci. 31:* 738-744. 1952.—Equations are given which will serve as a guide in setting-up similar studies and into which specific physical and economic data may be inserted to study costs under varying conditions.—*Authors.* (Biological Abstracts)

KING, R. A., and C. J. ZWICK. (Connecticut Agric. Expt. Sta., Storrs.)
COMPETITIVE POSITION OF THE CONNECTICUT POULTRY INDUSTRY. 4. SHRINKAGE OF LIVE POULTRY BETWEEN FARM AND MARKET. *Bull. Storrs Agric. Expt. Sta. 270:* 1-20. 1950. (Biological Abstracts)

KLOSE, A. A., F. A. KUMMEROW, GRAYCE GOERTZ, and HELEN L. HANSON. (West. Reg. Res. Lab., Albany, Calif.)
EFFECT OF ETHANOLAMINE AND CERTAIN DIETARY METABOLITES ON THE STORAGE STABILITY OF FROZEN TURKEYS. *Poultry Sci. 31:* 730-734. 1952.—The fat-stabilizing ability of ethanolamine, tocopherols, and certain other naturally occurring substances when fed to turkeys was tested in 2 practical feeding expts. In order to accentuate the instability so that effects might be measured more easily, the basal ration in 1 expt. contained increased amounts of wheat and alfalfa as a replacement for part of the corn and in the other contained 2% linseed oil. Chemical and organoleptic analyses revealed a marked decrease in stability due to the linseed oil but a questionable effect of alfalfa and wheat supplements. At the levels fed, the frozen storage stability of the turkeys was not improved by incorporating in the diet the following potential stabilizers: ethanolamine, tocopherol, pyridoxine, Ca pantothenate, mono-ethanol-ammonium gallate, and betaine.—*A. A. Klose.* (Biological Abstracts)

KLOSE, A. A., E. P. MECCHI, and H. L. HANSON. (West. Reg. Res. Lab., Albany, Calif.)
USE OF ANTIOXIDANTS IN THE FROZEN STORAGE OF TURKEYS. *Food Technol. 6(8):* 308-311. 1952.—Measurements were made of the extent of protection provided by antioxidants applied as solns. or suspensions in various carriers to the natural and cut surfaces of eviscerated turkeys in frozen storage. Peroxide development in the fat was well correlated with subjective scores for rancid off-flavor in the cooked turkey. Butylated hydroxy anisole, propyl gallate, and combinations of these antioxidants markedly reduced fat deterioration in frozen storage. Of the solvents or carriers used a 3% aqueous gelatin soln., in which the antioxidants were suspended at about 0.15% total concn., was most effective. The 3% gelatin coating alone provided some protection. Pro-oxidant effects produced by some samples of solvents suggest that care should be exercised in the selection of carriers for the antioxidants. The results indicate that coatings containing antioxidants offer considerable promise for increasing the frozen storage life of turkeys, especially when large surfaces are exposed as in eviscerated and cut-up poultry.—*A. A. Klose.* (Biological Abstracts)

KRITCHEVSKY, DAVID and S. ABRAHAM. (U. California, Berkeley, California.)
RADIOACTIVE EGGS. DEGRADATION OF YOLK GLYCEROL. *Arch. Biochem. and Biophys. 39(2):* 305-309. Illus. 1952.—The labeled glycerol obtained from the eggs of a hen continuously fed Na acetate-1-C^{14} for 7 days was degraded by 2 methods. The general pattern of activity distr. was 86-88% in the terminal C atoms and 12-14% in the middle C atom. A mechanism that might explain these results was suggested.—*Auth summ.* (Biological Abstracts)

McCARTNEY, MORLEY G. (Pennsylvania State Coll., State College.)
RATE OF GROWTH, EFFICIENCY OF FEED UTILIZATION, AND MARKET QUALITY IN THREE VARIETIES OF TURKEYS TO EIGHTEEN WEEKS. *Poultry Sci. 31:* 838-843. 1952.—Three vars. of turkeys, Broad Breasted Bronze, White Holland, and Beltsville Small

White, were compared for broiler-fryer production at 12, 15 and 18 weeks of age. Data were obtained on rate of growth, efficiency of feed utilization and market quality. Rate of growth and efficiency of feed utilization were best for the Broad Breasted Bronze var. However, the dressed carcass scores for the Beltsville Small Whites were better than those of the Broad Breasted Bronze var. These differences in carcass score were due mainly to the presence of dark pinfeathers in the Broad Breasted Bronze var. Regression equations and correlation coeffs. for the interrelation of live, dressed and eviscerated meat yields were calculated for the 3 vars. of turkeys during the 12-to 18-week growing period. The proportion of dressed carcass wt. and eviscerated carcass wt. to live body wt. was the highest for the Broad Breasted Bronze var. On the basis of these results, it is concluded that the Broad Breasted Bronze turkey would be the best var. to use for broiler-fryer production, provided a satisfactory method of processing could be found to reduce the dark pigment under the skin which results from the dark pinfeathers.—*M. G. McCartney.* (Biological Abstracts)

MANTLE, P. D.
THE AUSTRALIAN EGG INDUSTRY. *Amer. Egg and Poultry Rev. 14(4):* 34-35. 1952.—A photograph and a brief descr. of a vacuum egg extractor are given. The paraffining of eggs in prepn. for export is like-wise briefly described.—*H. G. Lindquist.* (Biological Abstracts)

SEAVER, S. K., and R. A. KING. (Agric. Expt. Sta., Storrs, Connecticut.)
COMPETITIVE POSITION OF THE CONNECTICUT POULTRY INDUSTRY. 3. MARKETING EGGS THROUGH WHOLESALE CHANNELS. *Bull. Storrs Agric. Expt. Sta. 269.* 5-27. 1951. (Biological Abstracts)

WOLK, JACK, E. H. McNALLY, and A. W. BRANT. (U. S. Dept. Agric., Beltsville, Md.)
YOLK MEASUREMENTS USED AS AN INDICATION OF TEMPERATURE DETERIORATION OF EGGS. *Poultry Sci. 31:* 586-589. 1952.—Yolk index divided by egg wt. was applied to 790 eggs held at 41, 59, 77 and 98°F. from 14 to 70 days. The effect of time on yolk condition is a linear regression, the slope of the line varying with the temp. Yolk height, being more accurately detd. and simple to measure, may be used in place of the yolk index as a measure of time and temp. deterioration of eggs.—*Authors.* (Biological Abstracts)

MANAGEMENT

HEISHMAN, J. O., C. J. CUNNINGHAM, and T. B. CLARK. (West Virginia U., Morgantown.)
FLOOR SPACE REQUIREMENT OF BROILERS. *Poultry Sci. 31:* 920. 1952.—*An abstract.* (Biological Abstracts)

MacILRAITH, J. J. (California Turkey Growers Assoc., Davis.)
ARTIFICIAL BREEDING AS A SUPPLEMENT TO NATURAL MATING IN BROAD BREASTED BRONZE TURKEYS. *Poultry Sci. 31:* 925. 1952.—*An abstract.* (Biological Abstracts)

PLATT, C. S. (Rutgers U., New Brunswick, N. J.)
MAINTAINING WINTER EGG PRODUCTION BY THE USE OF DIM RED LIGHT. *Poultry Sci. 31:* 931. 1952.—*An abstract.* (Biological Abstracts)

QUINN, J. P., and C. H. THOMPSON. (U.S. Dept. Agric., Beltsville, Md.)
EFFECT OF NEWCASTLE DISEASE LIVE-VIRUS VACCINATION OF IMMATURE WHITE LEGHORN PULLETS ON SUBSEQUENT EGG QUALITY. *Poultry Sci. 31:* 695-699. 1952.—The quality of eggs from White Leghorn pullets vaccinated at 3 months of age was compared with the quality of eggs from unvaccinated pullets. No dif-

ferences were found in egg wts., egg wt. losses, candled grades, or interior quality of eggs. The live-virus vaccination for Newcastle disease at 3 months of age had no effect on egg production, or sexual maturity of pullets.—*Authors.* (Biological Abstracts)

SUNDE, M. L. (U. Wisconsin, Madison.)
HOW TO ACHIEVE POULTRY FEED EFFICIENCY. *Feedstuffs 24(38):* 42-43. 1952.—In order to keep feed costs per pound of gain at a minimum, the feeder must keep mortality at a minimum, particularly that during the latter part of the growing period; keep feed costs low by proper formulation; and get good feed efficiency. Feed efficiency is affected by wastage, the feed, and the strain of poultry.—*H. L. Wileke.* (Biological Abstracts)

GENERAL

BREMNER, I. S. (Edinburgh Coll. Agric.)
POULTRY IN THE BORDERS. *Scottish Agric. 32(1):* 32-35. 1952.—Describes the development of the poultry industry in the Scottish Border counties in the last 50 yrs., dealing with egg stations, winter egg production, influence of war-time prices, the economics and methods of handling laying-hens and the future prospects of the industry.—*C. E. Foister.* (Biological Abstracts)

CORSE, M. A. (North Scot. Agric. Coll.)
ORKNEY'S POULTRY INDUSTRY. *Scottish Agric. 32(1):* 41-43. 1952.—Details the growth of this industry over some 40 yrs.: stock has trebled, Egg Packing Stations and Accredited (production) Stations (46) have been set up.—*C. E. Foister.* (Biological Abstracts)

HURRY, HARRY F., and A. W. NORDSKOG. (Iowa State Coll., Ames.)
STATISTICAL ERRORS IN GRADING CHICKS FOR FEATHER GROWTH. *Poultry Sci. 31:* 819-821. 1952.—300 Barred Rock and New Hampshire cockerels, 8 and 12 weeks of age, were scored for degree of feather growth by 3 graders working independently. Differences among graders, breeds, age, scoring days, and birds were evaluated as factors affecting variation in feathering. The principal sources of variation were due to differences between birds and the inaccuracy of judgment in grading. About 80% of the variance in exptl. error was due to bird differences. The remainder was due to errors in grading. However, when groups of birds of 10 or more are compared, it is not necessary for more than one person to do the grading.—*A. W. Nordskog.* (Biological Abstracts)

HUTT, F. B., and J. B. SUMNER. (Cornell U., Ithaca, N. Y.)
AN EGG ENCRUSTED WITH PROTOPORPHYRIN. *Science 116(3002):* 35-36. Illus. 1952.—Record of an egg probably held for several weeks in the oviduct of a 4-yr.-old hen of Barred Plymouth Rock and Rhode Island Red derivation. The normal egg shell was covered by a layer of protoporphyrin, the pigment normal to brown-colored eggs; shell deposition had seemingly been regular and then stopped, but protoporphyrin deposition had continued.—*C. A. Reed.* (Biological Abstracts)

PHILLIPS, H. J., and H. L. WIEGERS. (U. Nebraska, Lincoln.)
SETTLING RATE OF TURKEY SPERM ON A HAEMOCYTOMETER. *Poultry Sci. 31:* 681-684. 1952.—Turkey sperm settled at a constant rate to the ruled surface of a hemocytometer when dist. water was used as a diluent. Settling was completed in 8 min. Some spermatozoa adhered to the cover slip by chance, but the number had no statistical relationship to the number of spermatozoa for a given semen sample. Since no correction factor for the spermatozoa on the undersurface of the coverslip is possible, they must lie counted with those that settle to the surface of the hemocytometer.—*Authors.* (Biological Abstracts)

RICE, LESLIE I., ROSLYN B. ALFIN-SLATER, and HARRY J. DEUEL, JR. (U. So. California, Los Angeles.)
A METHOD FOR THE BIOLOGICAL PREPARATION OF DEUTERIUM-LABELED CHOLESTEROL FROM THE HEN'S EGG. *Proc. Soc. Exptl. Biol. and Med. 80(3):* 562-563. 1952.—Deuterium-labeled cholesterol was synthesized biologically in the eggs of hens which had been given, in their drinking water, an isotonic soln., of deuterium-labeled Na acetate dissolved in 2.5% D_2O. The daily incorporation of deuterium into the cholesterol and subsequent disappearance of the deuterium from the cholesterol after cessation of deuterium admn. were followed. (Biological Abstracts)

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UNITED STATES EXECUTIVE COMMITTEE FOR THE TENTH WORLD'S POULTRY CONGRESS

The United States Executive Committee for the Tenth World's Poultry Congress to be held in Edinburgh, Scotland, August 13-21, 1954, has now been set up as follows:

Chairman: Dr. O. B. Kent, Quaker Oats Company, Chicago, Illinois.

Secretary: Edward Karpoff, Bureau of Agricultural Economics, U. S. Department of Agriculture, Washington, D.C.

Vice-chairman for Tours: Jos. Wm. Kinghorne, Washington, D.C.

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Vice-chairman for Publicity: Fred Sang, Editor, "The Poultryman", Vineland, New Jersey.

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Vice-chairman for Educational Material: H. L. Shrader, Extension Service, U. S. Department of Agriculture, Washington, D. C.

Each Vice-chairman will select as members of his group representatives of such trade organizations and allied groups as will be appropriate for each operational function.

AMENDMENTS AND ADDITIONS TO THE CONSTITUTION OF THE WORLD'S POULTRY SCIENCE ASSOCIATION

At the meeting of Council held on August 4, 1951 in Paris, a Sub-Committee, consisting of Dr. G. F. Heuser, Mr. C. S. Th. Van Gink and Major Ian Macdougall was appointed to give consideration to a further revision of the Constitution of the Association. On the completion of the work of revision, the Sub-Committee's recommendations were submitted to the Council by whom they have been approved for submission to members. In terms of Section 7 of the Association's By-Laws which lays down that

> "Any proposed amendment to the Constitution or By-Laws shall be placed in the hands of each member of the Association at least three months prior to the time of voting on the amendment."

the suggested amendments are published herewith. The ballots designating approval or non-approval should be returned as soon as possible and not later than October 1, 1953 to Major Ian Macdougall, World's Poultry Science Association, 45, Bedford Square, London, W.C. 1. England.

New and changed portions are printed in italics.

THE WORLD'S POULTRY SCIENCE ASSOCIATION CONSTITUTION

ARTICLE I — NAME

The Name of this organization shall be "The World's Poultry Science Association."

ARTICLE II — OBJECTS

The Objects of this Association are:

(1) To facilitate in all possible ways the exchange of knowledge and experience among persons in all parts of the world who are contributing to the advancement of the various branches of the Poultry Industry by producing, breeding, hatching, marketing, teaching, research, observation, investigation, experiments, demonstration, organization, or in any other constructive manner.

(2) To promote the extension of knowledge in the above field by the encouragement of teaching, scientific research, practical experimentation, the collection and publication of statistics, the study of the economics of the poultry business, the study of the problems of production and marketing, and in every other way possible.

(3) The dissemination of knowledge pertaining to all branches of the Poultry Industry.

(4) The promotion of World's Poultry Congresses and co-operation with the governments of countries selected for these gatherings in their organization.

ARTICLE III—MEMBERSHIP

(1) Applications for Membership shall be made in writing, or on the forms provided for the purpose.

(2) Individual membership may be held by any person who is or has been engaged in any activity connected with the Poultry Industry and who is interested in the objectives of the Association.

The subscription of each individual Member of the Association shall be *Three* Dollars or One Pound or their equivalent per annum.

Individuals may become Life Members upon payment of *Thirty* Dollars or Ten Pounds or their equivalent in one sum.

(3) The Council shall have the power of appointing as Honorary Life Members such persons as it considers to have made a noteworthy contribution to the work of the Association or to the promotion of the Poultry Industry in any of its branches.

Honorary Life Members shall be exempt from the payment of dues.

(4) The Executive Committee shall be empowered to adjust the subscription rates to meet important changes in exchange rates.

(5) Associate membership may be held by bona fide poultry students during their studentship at Colleges, Universities and Agricultural Institutes. The subscription shall be one-half the current annual individual member rate.

ARTICLE IV — PATRONS

The Council may designate as a Patron of the Association any government department, which shall contribute to the Treasury of the Association the sum of not less than *Fifteen* Dollars, or Five Pounds or their equivalent per annum. Any country which by law cannot become a Patron may name any Association to represent it, and such Association shall have the privileges of Patrons.

ARTICLE V — AFFILIATIONS

Associations, Societies, Institutions, Clubs, other Organizations or Business Firms connected with any activity of the Poultry Industry are entitled to become Affiliated by the payment of an Annual fee of not less than *Fifteen* Dollars, or Five Pounds or their equivalent.

ARTICLE VI — OFFICERS AND COUNCIL

(1) The Officers of the Association shall consist of a President, *not less than three* Vice-Presidents, Honorary Past Officers, a Secretary, and a Treasurer.

(2) The affairs of the Association shall be managed by its Officers and a Council composed of such number of individual members of the Association from each country represented in the Association, having five or more members, according to the following schedule: five to twenty-five members, one member of Council; twenty-six to fifty members, two members of Council; for each fifty members over the first fifty members, one additional member of Council as soon as one half of a group of fifty has been reached. No country shall have more than 10 members of Council. *Council representation shall be forfeited when the number of members from any country falls below the minimum of five. The number of members of Council to which any country is entitled shall be based on the number of members in good standing on December 1st. Representation shall be restored when the paid-up membership returns to the minimum of five.*

(3) The term of office as President, Vice-Presidents, Secretary and Treasurer shall be three years. Each Member of the Council shall be elected for six years. The elections shall be held at the Triennial Meetings of the Association.

(4) For the election of President, Vice-Presidents, Secretary and Treasurer a *three-fifths* vote of the Council shall be required, and such election shall be at the Triennial Meetings. Nominations for these offices may be made in writing by any *Patron, Affiliation or* Member of the Association or by the Council.

(5) One-half of the Members of the Council shall be elected every three years at the Triennial Meetings. Nominations for the Council may be made to the Secretary in writing by any Patron or Affiliated Body or

Branch Organization or Member of the Association of the country concerned. If no nominations are received from such Members, nominations may be made by any Member of the Council. A majority vote of the Council shall be required for election.

(6) In all votes of the Council the requisite majorities specified in the foregoing clauses shall be construed as of those voting.

(7) The President, Vice-Presidents, Honorary Past Officers, Secretary and Treasurer, shall constitute an Executive Committee, with power to act.

(8) The term of office *of all officers and Members of Council* shall begin on January 1st following election.

(9) Sectional Secretaries may be appointed by the President as desirable, which officials shall be subject to the direction of the Secretary.

(10) Sectional Treasurers may be appointed by the President as desirable, which officials shall be subject to the direction of the Treasurer.

(11) The President shall have the power between regular meetings to appoint Members to unfilled vacancies and to vacancies on the Council by death, resignations and ineligibility, such term of office to extend until the next regular election.

(12) The finances of the Association shall be in control of the Treasurer subject to the Executive Committee in case of proposed exceptional expenditure. A report of work of the Association with Balance Sheet shall be issued periodically to all Members.

ARTICLE VII — BRANCH ORGANIZATIONS

(1) The Council may approve the formation of Branch Organizations, which will then be designated as Branches of the World's Poultry Science Association.

(2) The Secretary or Treasurer of each Branch shall be responsible for the collection of the annual subscriptions from the Branch members and the remittance of the necessary amounts to the Treasurer *or Secretary* of the World's Poultry Science Association.

(3) The Branch may retain an amount not to exceed 25 per cent of each annual subscription for local administrative purposes, *the amount to be subject to the approval of the Secretary and Treasurer of the Association.*

(4) The Secretary or Treasurer of each Branch shall submit an annual financial report to the Treasurer of the World's Poultry Science Association.

(5) Branch Organizations shall not include in their constitution and by-laws anything not in full accord with the Constitution and By-laws of the World's Poultry Science Association.

(6) Branch Organizations shall not restrict their members from acting as free and independent members of the World's Poultry Science Association, nor withhold, forbid or restrict their members in regards to any privilege granted by the World's Poultry Science Association to its members.

(7) Any person may be a member of the World's Poultry Science Association without being a member of the Branch Organization.

(8) Membership of the Branch Organizations must be confined to Members of the World's Poultry Science Association in the countries where Branch Organizations are established.

ARTICLE VIII — PUBLICATIONS

There shall be issued an official organ, known as the "World's Poultry Science Journal" and such other publications as may be approved by the Executive Committee, which shall be sent to all Members, Patrons and Affiliated Bodies in good standing as published. For this purpose an Editor shall be appointed by the Council on such conditions as may be agreed.

ARTICLE IX — MEETINGS

(1) General Meetings of the Association may be called by the President, Vice-Presidents or Secretary. Regular meetings of the Council and of Members of the Association shall be held every three years during the World's Poultry Congress, for the consideration of Report and Balance Sheet, Election of Officers, and General Business. Of such meetings adequate notice shall be given to Members.

(2) If in the opinion of the Officers of the Association, it is desirable and necessary for a vote to be taken on any specific matter at any General or Special meeting of the Association, the number of votes which each country may give shall be the same as the number of members on the Council for that country, except that countries not represented on the Council shall be entitled to one vote.

ARTICLE X — COMMITTEES

The President, Executive Committee or the Council of the Association is empowered to appoint Committees for any purpose, which may be temporary or for a period, in the latter case not exceeding three years, the Members of which shall then retire, but be eligible for reappointment.

ARTICLE XI — SUBSCRIPTIONS

The annual subscriptions are payable in advance on January 1st in each year to the Treasurer or whom he may designate. In case of failure to pay the subscription before June 1 the Member's name shall be removed from the mailing list of the Journal until renewal of his subscription. In the case of failure to pay the subscription before the end of the year, membership in the Association will be forfeited.

ARTICLE XII — WORLD'S POULTRY CONGRESSES

(1) World's Poultry Congresses shall be held every three years.

(2) The Council shall be empowered to accept from any Government an official invitation for the holding of a World's Poultry Congress.

(3) The President or his designated representative shall be empowered to approach countries with a view to obtaining an invitation for the succeeding Congress. If more than one invitation is in prospect the Secretary shall canvass the Council with a view to obtain the order in which the countries shall be approached. Negotiations will immediately be opened with the Government of the country receiving the greatest number of votes. Should the response be unfavorable the other countries receiving the next number of votes are to be approached in rotation. Negotiations shall be completed with one country before any other is approached.

(4) In the event of no invitations being received and accepted prior to the meeting of Council during a World's Poultry Congress, the Council shall vote its preference for at least three countries in the order which these countries should be approached by the President or his designated representative. Negotiations shall be completed with one country before any other is approached.

ARTICLE XIII — HONORARY OFFICERS

(1) The Council may designate as Honorary Past President any person who has held the office of President for one term.

(2) The Council may designate as Honorary Past Vice-President any person who has served as Vice-President for 12 years.

(3) The Council may designate as Honorary Past Secretary any person who has served as Secretary for 15 years.

(4) The Council may designate as Honorary Past Treasurer any person who has served as Treasurer for 15 years.

(5) The terms of Honorary Past Officers shall hold as long as they remain active members.

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BY-LAWS

Section 1. Six members of the Council representing at least four different countries shall constitute a quorum of that body.

Section 2. Twenty-five members of the Association shall constitute a quorum of the Association.

Section 3. On a request signed by at least five members of the Council the Secretary shall communicate to all members of the Council any matter of business and ask for their vote on the question, either by mail or in Session.

Section 4. On any postal vote of the Council or Association the polls shall be considered closed at two calendar months after the date of the original mailing.

Section 5. Membership in the association may be forfeited because of:

(a) failure to act in full accord with the objects of the Association as set forth in the Constitution;
(b) failure to pay the annual subscription within the year as provided in Article XI.

Section 6. The Constitution and By-Laws may be amended at any time by two-thirds vote of the members of the Association voting, representing at least half the number of countries which have at least 10 members. Such vote to be taken by mail.

Section 7. Any proposed amendment to the Constitution or By-Laws shall be placed in the hands of each member of the Association at least three months prior to the time of voting on the amendment.

Section 8. In all postal votes where a definite majority is specified in either Constitution or By-Laws such majority shall be construed as of those voting.

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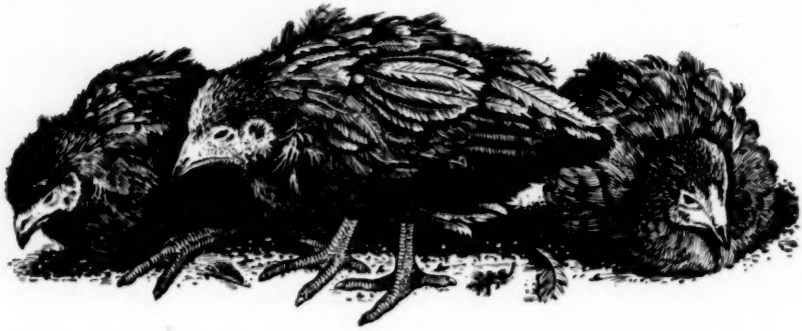

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SQ has reduced mortality to 2 per cent or less, even in multiple infections. It is the drug that:

- Stops all of the most damaging species of chicken and turkey coccidia.
- Is effective for both *prevention* and *control*.
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- Protects even under warm, moist conditions.
- Permits birds to develop immunity to coccidiosis.
- Reduces immediate mortality resulting from acute fowl cholera.
- Performs consistently! With Sulfaquinoxaline, coccidiosis has ceased to be a problem in more than 160 successive flocks raised on the same farm over a period of five years.

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grinds out MORE EGGS and MEAT from every bag of feed

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"All our growing stock as well as the 30,000 foundation breeding New Hampshires on our farm are fed Stonemo Granite Grit exclusively. We have chosen Stonemo with its extra grinding surfaces because we believe there is none better to help our birds grind out more eggs per pound of feed."

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"We discontinued using Stonemo for a while, but I feel sure now that it plays a very valuable part in the digestive process of poultry. So, from now on you may count on us as a regular customer."

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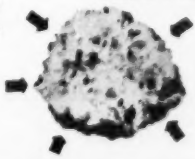

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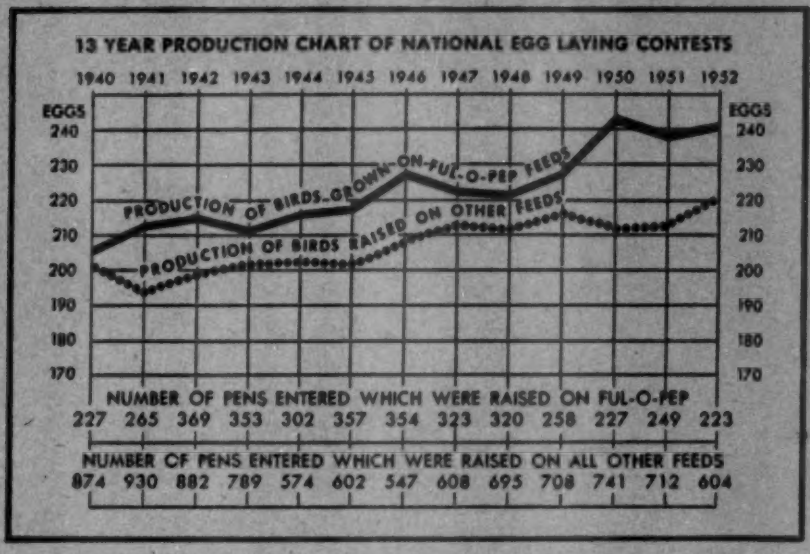
13 YEAR PRODUCTION CHART OF NATIONAL EGG LAYING CONTESTS
1940 1941 1942 1943 1944 1945 1946 1947 1948 1949 1950 1951 1952
EGGS
240
230
220
210
200
190
180
170
PRODUCTION OF BIRDS GROWN ON FUL-O-PEP FEEDS
PRODUCTION OF BIRDS RAISED ON OTHER FEEDS
NUMBER OF PENS ENTERED WHICH WERE RAISED ON FUL-O-PEP
227 265 369 353 302 357 354 323 320 258 227 249 223
NUMBER OF PENS ENTERED WHICH WERE RAISED ON ALL OTHER FEEDS
874 930 882 789 574 602 547 608 695 708 741 712 604

Birds grown on Ful-O-Pep average laying the equivalent of 15 MORE 2-OZ. EGGS EACH

INFORMATION PRESENTED in the above chart is excellent proof that Ful-O-Pep grows America's Best Pullets.

YOU WILL NOTE that for the past 13 years in these official contests, 49,751 Ful-O-Pep raised birds averaged laying the equivalent of 15 more 2-oz. eggs each than the average of 120,458 birds grown on all other feeds. And during this time over half of the winning pens and hens were grown on Ful-O-Pep.

IN THE 1952 CONTESTS Ful O-Pep raised birds averaged laying the equivalent of 19 more 2-oz. eggs each than birds grown on all other brands of feed. Ful-O-Pep feeders also won high pen in 6 and high hen in 7 of the 13 official tests.

CERTAINLY THIS SUPERIOR egg production is outstanding proof that Ful-O-Pep Research is building better feeds. Best of all, the Ful-O-Pep Restricted Feeding Plan saves poultrymen up to 30% feed cost for growing pullets . . . the kind of birds that produce well and stand up under the strain of heavy, continuous laying.

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CONGRESS

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